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INDEX.

	Page.		Page.
A.		Board of Agriculture, Formation of	655
Abnormally Heavy Calves	142	Board of Horticulture—Western Province	13
About Rape	633	Book Keeping, Farmers	635
Actual Results of Irrigation, Evaporation and Dry Land Experiments in Cape Colony	547	Books, Farmers' Stock	608
Agricultural Co-operation	281	Boring, Artesian Well	470
Agriculture, Future Development of	692	Boring for Water	371
Agricultural Instruction at St. Andrew's	395	Boreholes, Pumping Tests on	607
Agricultural Organisation—Formation of Board of Agriculture	655	Botanic Garden, South African	638
Agricultural Show Season, 1910—Some Champions	422	Brandy, Rate of Distillation of Volatile Constituents in the Manufacture of Pure Wine	231
Agricultural Societies—Government Grants to	6	Breeding, Danish System of Cattle	465
Agricultural Zoology for South African Students	43, 327, 423, 561, 659	Breeding Industry, Poitou Mule	150
Albany Show Yard, The New	510		
Alcohol and Fibre from Leaves and Stems of Plants	479	C.	
Analysis of Fertilisers, 1909 Season	227	Calves, Abnormally Heavy	142
Animal Diseases—Contagious and Infectious—Monthly Return	64, 225, 558, 464, 560, 700	Cape Fruit for America	236
Animals, Humane Slaughtering of	397	Cape Fruit in the Transvaal, Rejection of	10
Another Nitrogenous Fertiliser	397	Cape Kapok	3
Another Prickly Pear Exterminator	488	Cape Produce Condemned in the Transvaal	108, 244, 730
Annual Wine Show	631	Capri and Calimyrna Figs for Distribution	628
Argemone Mexicana or Mexican Poppy	642	Carbon Bi-Sulphide for Grain Insects	643
Arsenite of Soda, Distribution of	144	Care of Farm Implements	283
Arsenite of Soda	628	Carp and Trout, Supply of	8
Artesian Well Boring	470	Cattle Breeding, Danish System of	465
		Cattle, Insecticide Device for	280
B.		Cereals—Co operative Experiments	583
Bee-Keeping Demonstration	513	Certain Death to Moles	250
Bees Important to Lucerne	146	Charcoal, Making of	115
Bee Stings, Permanganate of Potash for	735	Charges, Seed Testing	395
Beetle, Destructive—(Decatomia histrio)	3	Chemical Changes in Ensilage	277
Beetle, Destructive	250	Chinkerinchee Poisoning	512
Beetles, Moles and—Destruction of	368	Cholera, Fowl, or Blue Comb	278
Biliary Fever in Dogs, Further Note on Drug Treatment	541	Circular Dipping Tanks	250, 418
Birds, Small, and Hares, Poisoning	735	Circular Sheep Dips	372
Birds, Small, Plague of	489	Citrus Publications	629
Block System of Scab Eradication—Scab Legislation under Union	294	Clarification of Honey	250, 487
Blue Comb, Fowl Cholera or	278	Closer Settlement, Lesson in	355
		Cnicus Lanceolatus, or Spear Thistle	674
		Codling Moth, Preventing the Spread of	142
		Codling Moth, Sorting for	143
		Concrete Fence Posts—Reinforced	421
		Congress, Farmers', 1910	701
		Co-operation, Practical Agricultural	281
		Co-operative Experiments—Cereals	583

	Page.
Co-operative Experiments—Grasses	675
Co-operative Experiments—Maize	439
Complex Question	117
Contagious and Infectious Animal Diseases—Monthly Return	64, 225, 358, 464, 560, 700
Current Market Rates—Wholesale	134, 268, 383, 751

D.

Dairying Congress	394
Dairy Industry, South African	367
Dam Building—A Peculiar Experience	118, 276
Dams, Fishes and	608
Danish System of Cattle Breeding	465
Dangers of Improperly Prepared Lucerne Hay	736
Decatomia histrio—Destructive Beetle	3
Derrick—Ladder and	278
Destructive Beetle	250
Destructive Beetle—Decatomia histrio	3
Destruction of Moles and Beetles	368
Destruction of Prickly Pear—Jansen's Extirpator	354
Destruction of Prickly Pear—St. O'Gorman Experiments	226
Deterioration—Veld	323
Development of Agriculture, Future	692
Development, Irrigation, in South Africa with State Aid	530
Dipping Tanks—Circular	250, 418
Diseases of the Ostrich—Notes on some	34
Diseases, Ticks and Stock	474
Distillation of Volatile Constituents in the manufacture of Pure Wine Brandy, Rate of	231
Distribution of Arsenite of Soda	144
Distribution of Wheat, Oats and Barley Seeds for 1910 Season	216
Dried Fruit and Raisin Industry	636
Dried Fruit Show, Raisins and	514
Drug Treatment of Biliary Fever in Dogs, Further Note on	541
Drying Up?—Is South Africa	167, 395, 405
Dry Land Experiments in Cape Colony	547
Dry Land Farming—Experiments at Robertson Experiment Station	286
Dry Land Farming in the United States	393
Duration of Scab Infection	514

E.

East Coast Fever	19, 219, 359, 600
Eelworm in Lucerne—Tylenchus	249
Egg-Laying Competition—Third Annual	731
Elsenberg College Herd—Milk Record	42, 235, 365, 437, 625, 691
English Rail Rates on Grapes and Pines	2
Ensilage—Chemical Changes in	277
Ensilage, Deadly Poison for Horses	6
Enterprise at Sutherland	510
Eradication of Scab	487
Evaporation and Dry Land Experiments	547

Page.

Exhibit, Remarkable—Mr. C. Gardner's	511
Experiments, Co-operative—Cereals	583
Experiments, Co-operative—Maize	439
Experiments, Co-operative—Grasses	675
Experiment, Manurial, with Oats, Humansdorp	652
Experiments with Ostriches—XIII. The Influence of Nutrition, Season and Quilling on the Feather Crop	27
Experiment Station, Robertson—Dry Land Farming	286
Experiment Station, Robertson—Soil Evaporation	342
Experiment—Seeds for	198
Experiments in Wheat Manuring, Humansdorp	647
Export of Fruit to Rhodesia	285
Export Fruit Trade	2
Export Trade, Fresh Fruit—Report of Trades Commissioner	65

F.

Farmers' Book-keeping	635
Farmers' Congress, 1910	701
Farming, Dry Land—Experiments at Robertson Experiment Station	286
Farm Implements—Care of	283
Farm Night Soil	738
Farmers' Stock Books	608
Fattening Pigs	144
Federation Wheat, Story of	396
Fences—Loans for Vermin Proof Dividing	277
Fence Posts—Reinforced Concrete	421
Fertilization of Turkeys	117, 371
Fertiliser, Analysis of, 1909 Season	227
Fertiliser, Another Nitrogenous	397
Fever—East Coast	19, 219, 359, 600
Fibre from Leaves and Stems of Plants, Industrial Alcohol and	479
Field Trials of Land Level-taking Instruments at Middelburg, Cape	433
Figs, Capri and Calimyrna, for Distribution	628
Fine Pig	629
Fishes and Dams	608
Fish River at Baroda—Weir across	281
Flax or Linseed	349
Forests, Influence of, on Water Supply	412
Fowl Cholera or Blue Comb	278
Fraserburg Notes	510
Fresh Fruit Export Trade—Report of Trades Commissioner	65
Fruit, Cape, Rejection of, in Transvaal	10
Fruit for America, Cape	236
Fruit Export—Monthly Return	106, 170, 348, 478, 606, 739
Fruit Export Trade, Fresh—Report of Trades Commissioner	65
Fruit Fly Remedy, Mally—Brilliant Success	146
Fruit, Losses in Transportation and Storage of	240
Fruit Trade—Export	2
Fruit to Rhodesia—Export of	285
Future Development of Agriculture	692

G.

	Page.
Gall, Giant Twig	408
Gardner's, Mr. C. Remarkable exhibit	511
Geel Dikkop in Sheep	115
Giant Twig Gall	408
Glass Bells, Raising Plants under	396
Goats, Sheep and, Heartwater in	554
Government Assistance to Veterinary Students	276
Government Grants to Agricultural Societies	6
Grain Insects, Carbon Bi-Sulphide for	643
Grapes and Pines—English Rail Rates on	2
Grasses—Co-operative Experiments	675

H.

Hand Power Threshing Machine	485, 736
Hares, Small Birds and, Poisoning	735
Harvesting Lucerne for Seed	4
Heartwater in Sheep and Goats	554
Home-made Soap	485
Honey, Clarification of	250, 487
Honey—Lucerne for	5
Horses—Ensilage, Deadly Poison to Horticulture, Viticulture and, in Germany—Scientific	6, 9
Horticulture, Western Province Board of	13
Humane Slaughtering of Animals	397
Hybridisation, Wheat—Report on First South African Wheat Hybrids	15

I.

Implements, Farm, Care of	283
Implement Trials at Middelburg, 1911	510
Imported Merinos for Colesberg	4
Importation of Pigs and Sheep from Cape to Rhodesia	5
Improving Merino Flocks by Selection	578
Industrial Alcohol and Fibre from Leaves and Stems of Plants	479
Infectious Animal Diseases, Contagious and—Monthly Return	64, 225, 358, 464, 560, 700
Influence of Forests on Water Supply	412
Insecticide Device for Cattle	280
Insects, Grain, Carbon Bi-Sulphide for	643
Insurance, Live Stock	515
Internal Parasite of the Ostrich—Notes on	60
Irrigation, Evaporation and Dry Land Experiments in Cape Colony, Actual results of	547
Irrigation Development in South Africa with State Aid	530,
Is South Africa Drying Up?	167, 395, 405, 632

J.

Jackal Poison	607
Jackals, Poisoning—Yet another cute dodge	370
Jansen's Prickly Pear Extirpator	354

K.

	Page.
Kapok—Cape	3
Karoo, The Western—Rural Cape Colony, No. XXX	179
Ked, or Sheep Louse	398
Koen and Gouws Prickly Pear Destroyer	630

L.

Ladder and Derrick	278
Land Level Taking Instruments—Field Trials at Middelburg	433
Lesson in Closer Settlement	355
Lime and Milk	733
Linseed, Flax or	349
Live Stock Insurance	515
Live Stock Register and Wages Book	403
Loans for Vermin Proof Dividing Fences	277
Locust Destruction—1909-10	158
London Ostrich Feather Sale	285
Losses in Transportation and Storage of Fruit	240
Lucerne, Nurse Crop not best for	142
Lucerne Seed and Tylenchus, or Eelworm	508
Lucerne, Bees important to	146
Lucerne, Eelworm in—Tylenchus	249
Lucerne Hay, Dangers of improperly prepared	736
Lucerne for Honey	5
Lucerne—Life of	8
Lucerne, Ostriches on	512
Lucerne for Seed—Harvesting	4
Lucerne Tylenchus	155
Lurchers, Wanted, Norfolk	120

M.

Maize—Co-operative Experiments	438
Making of Charcoal	115
Mally Fruit Fly Remedy—Brilliant Success	146
Manurial Experiment with Oats, Humansdorp	652
Manures, Mixing of	628
Manuring Problem	735
Manuring Wheat at Humansdorp	647
Markets—Produce	156, 270, 385, 503, 621, 752
Market Rates—Current—Wholesale	134, 268, 385, 751
Miscible Oils for Spraying	110
Milk, Lime and	735
Milk Record—Elsenberg College Herd	42, 235, 365, 437, 625, 691
Mixing of Manures	628
Merinos for Colesberg—Imported	4
Merino Flocks, Improving by selection	578
Merinos, French Rambouillet	508
Merino Sheep—Rambouillet	196
Mexican Poppy, <i>Argemone Mexicana</i>	392, 642
Moles, Certain death to	250
Moles and Beetles, Destruction of	368
Mud Fish, Tortoises and	120
Mud Fish	372
Mule Breeding Industry, Poitou	150
Mystery of the Mud Turtle	370

N.

	Page.
Night Soil, Farm	738
Nitrogenous Fertiliser	397
Notes on an Internal Parasite of the Ostrich	60
Notes on some Diseases of the Ostrich	34
Notes on the Weather	125, 257, 375, 493, 611, 741
Nurse Crop not best for Lucerne	142

O.

Oats, Manurial Experiment, Humans dorp	652
Oils, Miscible, for Spraying	110
Ostrich Chicks, Sick	247
Ostrich Chicks, Sickness in	489
Ostrich Eggs, Storing for Incubation	247
Ostriches, Experiments with—XIII. The influence of Nutrition, Season and Quilling on the Feather Crop	27
Ostrich Feather Sales—London	285
Ostrich—Notes on an Internal Parasite of the	60
Ostriches on Lucerne	512
Ostrich—Notes on some Diseases of the	34
Ostriches, Snakes and	247

P.

Packed Commodities — Reduced Weights	628
Parasite, Internal, of the Ostrich, Notes on	60
Paspalum Dilatatum	118
Pernanganate of Potash for Bee Stings	735
Perennial Weeds	634
Pig, A Fine	629
Pigs, Fattening	144
Pines, Grapes and—English Rail Rates on	2
Plague of Small Birds	489, 607
Plants, Poisonous, South African	148
Poisoning, Chinkerinchee—(Ornithogalum thyrsoides)	512
Poison Controversy	119
Poison Dispute	489
Poison to Horses—Ensilage Deadly	6
Poisoning Jackals — Another cute dodge	370
Poisonous Plants, South African	148
Poisoning small Birds and Hares	735
Poison Mule Breeding Industry	150
Poultry Industry	630
Practical Agricultural Co-operation	281
Preventing the Spread of Codling Moth	142
Prickly Pear as a Pest	115
Prickly Pear Destroyer—Koen and Gouws	630
Prickly Pear, Destruction of—St. O'Gorman Experiments	226
Prickly Pear, Destruction of—Jansen's Extirpator	354
Prickly Pear Exterminator, Another	488
Produce, Cape, Condemned in the Transvaal	108, 244, 730

Page.

Produce Markets	136, 270, 385, 503, 621, 752
Publications, Citrus	629
Pumping by Suction Gas	509
Pumping Tests on Boreholes	607

Q.

Quarter Evil, Spontziekte, Vaccine	143
--	-----

R.

Railrates, English, on Grapes and Pines	2
Rainfall and Run-Off	633
Rainfall	129, 263, 379, 498, 616, 746
Raisins	171
Raisin Industry, Dried Fruit and	636
Raisins and Dried Fruit Show	514
Raising Plants under Glass Bells	396
Rambouillet Merinos, French	508
Rambouillet Merino Sheep	196
Rape, About	635
Rat Destruction	634
Rate of Distillation of Volatile Constituents in the Manufacture of Pure Wine Brandy	231
Reduced Weights—Packed Commodities	628
Register and Wages Book, Live Stock	403
Reinforced Concrete Fence Posts	421
Rejection of Cape Fruit in the Transvaal	10
Remarkable Exhibit—Mr. C. Gardner's	511
Robertson Experiment Station—Dry Land Farming Experiments	286
Robertson Experiment Station—Soil Evaporation Experiments	342
Rural Cape Colony, No. XXX.—The Western Karoo	179
Rural Cape Colony, No. XXX.—Smartt Syndicate Farms, Britstown	307

S.

South African Dairy Industry	367
S.A. Dairying Congress	394
Salt for Sheep	280
Scab, Eradication of	487
Scab Infection, Duration of	514
Scab Legislation under Union—The Block System	294
Scientific Viticulture and Horticulture in Germany	9
Seeds, Distribution of Wheat, Oats and Barley, for Season 1910	216
Seeds for Experiment	198
Seed Testing Charges	395
Seed Testing—Purity and Germination	350
Sheep Dips	118
Sheep Dips, Circular	372
Sheep, Geel Dikkop in	115
Sheep and Goats, Heurwater in	554
Sheep Louse, Ked or	398
Sheep, Rambouillet Merino	196
Sheep, Salt for	280

	Page.
Sick Ostrich Chicks	247
Sickness in Ostrich Chicks	489
Slaughtering of Animals, Humane	397
Small Birds, Plague of	489
Smartt Syndicate Farms, Britstown— Rural Cape Colony, No. XXX.	307
Snake Bites	736
Snakes and Ostriches	247
Soap—Home-made	485
Soda, Arsenite of	628
Soil Evaporation—Experiment at Robertson Experiment Station	342
Sorting for Codling Moth	143
South African Botanic Garden	638
South African Poisonous Plants	148
South African Stud Book, 1909	147
South African Wool and the Wool Market	283
Spear Thistle, <i>Chicus lanceolatus</i> , or Spraying, Miscible Oils for	674
Spontaneous (Quarter Evil) Vaccine	110
Stock Books for Farmers	143
Stock Diseases, Ticks and	217.
Storage of Fruit, Losses in Transpor- tation and	608
Storing Ostrich Eggs for Incubation	474
Story of Federation Wheat	240
Strange Occurrence	247
Suction Gas, Pumping by	396
Supply of Carp and Trout	370
Sutherland, Enterprise at	509
	8
	510

T.

Testing Seed—Purity and Germina- tion	351
Third Egg-Laying Competition	731
Thistle, Spear, <i>Chicus lanceolatus</i>	674
Threshing Machine, Hand Power	485.
Ticks and Stock Diseases	474
Tobacco Industry, Turkish, in Cape Colony	516
Tortoises and Mud Fish	120
Transportation and Storage of Fruit, Losses in	240
Transvaal—Rejection of Cape Fruit in	10
Trout, Carp and—Supply of	8

	Page.
Trout Fishing—New Regulations	145
Turkeys, Fertilisation of	117.
Turkish Tobacco Industry in Cape Colony	516
Twig Gall, Giant	408
Tylenchus—Eelworm in Lucerne	249
Tylenchus or Eelworm, Lucerne Seed and	508
Tylenchus, Lucerne	155

V.

Veld Deterioration	323
Vermin Proof Dividing Fences—Loans for	277
Veterinary Students Government Assistance to	276
Viticulture and Horticulture in Ger- many—Scientific	9

W.

Wages Book, Live Stock Register and	403
Wanted, Norfolk Lurchers	120
Water, Boring for	371
Water Supply, Influence of Forests on	412
Weather, Notes on the 125, 257, 375, 493, 611, ...	741
Weeds, Perennial	634
Weir across Fish River at Baroda	281
Well Boring, Artesian	470
Western Province Board of Horticul- ture	13
Wheat Hybridisation—Report on First South African Wheat Hybrids	15
Wheat, Manuring, at Humansdorp	647
Wheat, Story of Federation	396
Wine Show, Annual	631
Wool and the Wool Market—South African	285

Z.

Zoology, Agricultural, for South African Students 43, 327, 423, 561, 659	
---	--

LIST OF ILLUSTRATIONS IN THE TEXT.

	Page.		Page.
Wheat Hybridisation ... facing 16 and 17	17	Views at Houwater and Tigerpoort Vlei ...	311
Experiments with Ostriches—Barber and Moss Plumes ... facing	32	Lucerne Harvesting at Houwater	312
Earthing up Wheat to Increase Yield facing	33	Franco-American Stud Sheep at Doorskuielen ...	315
Diseases of Ostrich—Ostriches affected with Paralysis ...	37	Elevation of Main Dam, Kaffirs Poort ...	316
Diseases of Ostrich—Sick Birds in Last Stages ...	39	Views showing Construction Work on Dam ...	318
Agricultural Zoology ... 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 328, 329, 330, 331, 332, 334, 335, 336, 337, 338, 340, 341, 424, 425, 426, 427, 428, 429, 430, 431, 562, 563, 564, 565, 566, 567, 568, 569, 572, 574, 576, 660, 662, 663, 664, 666, 669, 671, 673		Outline of Kaffir's Poort Dam ...	319
Intestinal Parasite of Ostrich:—		Views showing Ongers River in Flood ...	320
Sclerostome, natural size ...	60	Views on Gembak Dam ...	321
Head of Male magnified, and Head of Female magnified ...	61	Soil Evaporation:—	
Head of Female, showing details	62	Drums drawn up for Weighing ...	342
Hind End of Female, magnified	63	Drums out for filling with Soil ...	343
Hind End of Male, magnified ...	63	Method of Weighing Drums ...	343
South African Poisonous Plants:—		Same, showing Truck Scale ...	344
The C'Nenta Plant—Cotyledon		Chart, illustrating Results ...	345
Ventricosa ...	148	The Ked or Sheep Louse, magnified ...	398
Cotyledon Eckloniana ...	149	Giant Twig Gall:—	
Mr. J. Rawbone's Prize Ayrshires at Stellenbosch ...	149	Growth on Willow Twig ...	408
Typical Poitou Jackass ...	151	Large Gall, both sides, natural size ...	409
Lucerne Tylenchus—Plants showing Typical Swellings ... facing	156	Circular Sheep Dipping Tank, with Kraals and Yards ...	419
Rural Cape Colony:—		Some Champions of 1909 facing et seq.	422
Paardekraal, Beaufort West ...	181	Thoroughbred Stallion, Califa; Hackney Stallion, Lord Donnington; Imported Mare, Heacham Minnie; S. A. Stallion, Silver Tail; Friesland Bull and Cow (Gilchrist); Jersey Bull (Barry) and Ayrshire Bull (Rawbone); Short-horn Bull, Steingot Duchess Beau (Edwards Bros.); Ayrshire Cow, Handsome Nell (Rawbone); Angora Champions and Merinos.	
Flood Weir on Zak River at Paardekraal ...	182	Land Level-taking Instruments—Prize Instruments, Middelburg ...	433
Merino Stud Ram at Paardekraal	183	Pumping by Suction Gas—Ruston-Prostor Plant at Work ...	509
Mares in Veld and Lucerne Lands, Paardekraal ...	184	Mr. C. Gardner's Remarkable Exhibit	511
Zeekoegat at Grootvlei ...	185	Bee-Keeping Demonstration at Port Elizabeth ...	513
Rhenosterkolk, Carnarvon	186	Turkish Tobacco Industry in Cape Colony:—	
Dam and Pumping Plant, Rhenosterkolk ...	187	Tobacco in bales ...	517
Friesland Bull at Rhenosterkolk	188	50 Acre Field of Turkish Tobacco at Seven Rivers; Threading the Leaves; Curing Shed or Wilting Room; Handling the Leaves; View of Curing Camp; Cigarette Makers at Work; Virginian Tobacco at Bottelary; Manurial Experiments at Neethlingshof following	522
Vines, Fruit and Lucerne, Schietfontein, Carnarvon ...	189	A Fine Pig—Bred in Namaqualand ...	620
Lucerne and Orchards, Town Gardens, Carnarvon ...	190	The Mixing of Manure—Coloured diagram, inserted loose.	
Wheat from Zaaipoort, Carnarvon	191	Argemone Mexicana, or Mexican Poppy ... facing	642
Homestead, Blaauwkrantz, Carnarvon ...	193	Cnicus lanceolatus, Hoffm., or Spear Thistle ... facing	672
Lucerne and Orchards, Blaauwkrantz ...	194		
Ladder and Derrick ...	278		
Weir across Fish River at Baroda ...	281		
Dry Land Farming:—			
Sub-surface Packer ready for use	287		
Samples of Wheat in Various Experiments ...	289, 290, 291		
Rural Cape Colony—Smartt Syndicate Farms, Britstown:—			
Houwater Dam and Homestead, Doorskuielen ...	308		
Plan of Houwater Dam ...	309		

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CONTENTS.

	PAGE
NOTES	2
The Free List—Correction—The Export Fruit Trade—English Rail Rates on Grapes and Pines—Cape Kapok—A Destructive Beetle (<i>Decatoma histrio</i>)—Harvesting Lucerne for Seed—Imported Merinos for Colesberg—Importation of Pigs and Sheep from Cape Colony into Rhodesia—Lucerne for Honey—Engage Deadly Poison to Horses—Government Grants to Agricultural Societies—The Life of Lucerne—Supply of Carp and Trout—Scientific Viticulture and Horticulture in Germany—Rejection of Cape Fruit in the Transvaal.	
WESTERN PROVINCE BOARD OF HORTICULTURE	13
WHEAT HYBRIDISATION (<i>Illustrated</i>)	15
SHOW DATES, 1910	18
EAST COAST FEVER	19
EXPERIMENTS WITH OSTRICHES—XIII (<i>Illustrated</i>)	27
EARTHING UP OF WHEAT TO INCREASE YIELD (<i>Illustrated</i>)	33
NOTES ON SOME DISEASES OF THE OSTRICH (<i>Illustrated</i>)	34
MILK RECORD	42
AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS (<i>continued</i>)—(<i>Illustrated</i>)	43
NOTES ON AN INTESTINAL PARASITE OF THE OSTRICH (<i>Illustrated</i>)	60
RETURN OF OUTBREAKS OF CONTAGIOUS DISEASES	64
THE FRESH FRUIT EXPORT TRADE	65
FRUIT EXPORT FOR NOVEMBER, 1909	167
CAPE PRODUCE CONDEMNED IN THE TRANSVAAL	108
MISCIBLE OILS FOR SPRAYING	110
CORRESPONDENCE	115
The Making of Charcoal—Geel Dikkop in Sheep—Prickly Pear as a Pest—A Complex Question—The Fertilization of Turkeys—(An Exploded Idea)— <i>Paspalum Dilatatum</i> —Dam Building (A Peculiar Experience)—The Poison Controversy—Tortoises and Mud Fish—Wanted—Norfolk Lurchers.	
NOTES ON THE WEATHER OF NOVEMBER, 1909	125
RAINFALL	129
CURRENT MARKET RATES	134
PRODUCE MARKETS	136

NOTES.

The Free List.

As upwards of a thousand additional names of farmers have been placed on the Free List of the *Agricultural Journal*, no further applications can be considered for the present. The list is again closed till further notice.

Correction.

In the article entitled "Judging and Valuation of Ostrich Feathers, and Feathers required by the Trade for Special Purposes," appearing in the December, 1909, issue of the *Journal*, an error occurs in the inscriptions to the illustrations. The inscriptions of the figures 4 and 7 should be reversed. Thus the figures under the fourth plate (taken in the order they appear in the *Journal*), which read "Fig. 4. Feather 2. Feather 3," should correctly read "Fig. 7. Feather 5. Feather 2," and, as a result, the figures under the seventh plate, which read "Fig. 7. Feather 5. Feather 2," should read "Fig. 4. Feather 2. Feather 3."

The Export Fruit Trade.

A good deal of space is occupied in this issue with matter pertaining to the oversea export of fresh fruit, and though this industry cannot, as yet, be classed as of primary importance, it is of such promise as to fully justify the attention it now receives. The reason why we publish the full text of the Trades Commissioner's Report, together with the Departmental memorandum thereon, is to obviate, if possible, any repetition of the elementary mistakes of past seasons. The Trades Commissioner and the Departmental officers have taken great pains to make the whole position of this trade quite clear, and any losses or disappointments arising out of shipments in the future must be greatly minimised if the information now published is studied with intelligent care. In any case, there can now be little excuse for doing what is positively wrong and futile as some shippers in the past have persisted in doing.

English Rail Rates on Grapes and Pines.

In connection with the export of fruit to London and its distribution to English provincial markets, a communication has been received from the Trades Commissioner intimating that the Railway Companies have agreed to place grapes and pines (when packed in accordance with the system adopted for fruit shipped from this Colony) from January 1st under Class 3 instead of Classes 5 and 4 respectively as heretofore. This means that for a given distance on the London and South-Western Railway the freight under Class 3 charged would be 44s. 6d. per ton, under Class 4, 53s. 11d. per ton, and under Class 5, 62s. 6d. per ton. This reduction should help in the more extended distribution of the shipments and a consequent broadening of the market.

Cape Kapok.

A report has been received from the British Cotton Growers' Association upon a sample of Cape Kapok, *Aselepias*, *Sp.*, probably *fruticosa*, *L.*, received from Griqualand West, stating that the article cannot be used for spinning, but is principally employed for stuffing upholstery. The sample forwarded was considered a most excellent one, and was estimated to be worth in bulk, about 6½d. per lb. It was also suggested that the best method to test the market would be to send a small shipment for trial. Cape Kapok, also known as Tontelbosch, erroneously called Wild Cotton at times, is found in a wild state growing extensively in certain parts of the Colony, and it is worth the consideration of farmers whether it would not be remunerative to take steps for the collection of the article, through natives, for the purpose suggested by the British Cotton Growers' Association. Our Cape Kapok must not be confused with the true commercial Kapok (*Eriodendron aufractuosum*), known as the "Silk Cotton Tree," which belongs to the order "*Malvaceae*," and is a lofty forest tree widely distributed in the Tropics of the Old and New Worlds.

A Destructive Beetle-- *Decatoma histrio*.

Mr. S. Meaker, writes from Daggaboers Hock, under date December 24:—Could you or any of your readers kindly inform me the best method of destroying a species of beetle which attacked my potatoes in thousands a day or two ago, devouring the plant "locust fashion?" The beetle in question has a long, narrow body, with yellow spots on the wings. I enclose a specimen. I may add that I have succeeded in killing the majority by spraying them with paraffin. But is this not injurious to the plant? As I only sprayed two days ago, no noticeable harm has resulted to the potato plants.

To this letter the Government Entomologist replied as under:—The beetle with your letter of the 24th December is named *Decatoma histrio*, Mars. It is one of the Mylabrid beetles, one kind or another of which is very commonly reported to be injuring the blossoms of fruit trees, garden, vegetables, and ornamental plants in the early summer. The many species vary considerably in size, but the long body and sloping black wing covered with bright yellow bands or blotches, are common characters. There is a regrettable dearth of knowledge in regard to their early stages, but there is some reason for supposing that the larvae prey on locust and grasshopper eggs, and therefore that the insects should not be regarded as altogether injurious. While there is doubt, the farmer is justified in killing the beetles that threaten his garden. Ordinarily little can be done other than hand-picking, as the creatures practically confine themselves to flowers. The writer does not recall observing severe damage to foliage, as seems to be intimated in the present complaint. The foliage of most plants would become severely scorched by a spray of paraffin, and its use is undesirable for this reason. Moreover, paraffin is too expensive a material to use as a spray to kill them, but nothing is better to knock them into in hand collecting. A little in the bottom of a tin will then suffice for a great number. The degree of injury to the plant by paraffin depends largely on the weather conditions. When the foliage is attacked, arsenate of lead should be effective as a spray if it were used strong—say, at the rate of three pounds to fifty gallons of water.

Harvesting Lucerne for Seed.

In harvesting alfalfa for seed, cutting should be done when the greater proportion of the seeds are hard, but not sufficiently ripe to shell. At this stage a majority of the pods are turned a dark-brown colour, and the seeds are fully developed. Frequently the cutting can be raked into windrows after two hours if the weather is drying, and in two or three hours more put into cocks and let stand from twenty-four to forty-eight hours, as the weather may justify. It should, however, be well cured and thoroughly dry when put in the stack, or there is danger of heating, and stack-heating seriously injures the vitality of the seed. It is not uncommon, if extremely ripe, to leave the cutting in the swath only an hour or a half-hour, then stack, and let stand for autumn or later threshing. If allowed to stand in the stack for about thirty days, the entire mass goes through a sweating and curing process which makes the threshing easier, while less of the seed is left in the straw than would be if it had not been stack-cured. In western Kansas many seed raisers cut their seed crop with a self-binder, put the sheaves in shocks the same day, and thresh in about ten days, or put it into a stack to await a convenient threshing time. They claim to secure 20 per cent. more of the seed in this way than if they cut with the ordinary mower. Others cut with a mower having a dropper attachment which leaves the alfalfa in small bunches at the will of the driver, in the centre of the swath, and these are "straddled" by the team and the wheels of the mower in the consequent rounds. These bunches are left for two or three days and then stacked. There is little, if any, danger from mould or spontaneous combustion in stacks of alfalfa cut for seed, but there is danger of the seed heating in the stack if stacked when damp. If bright, clean seed is expected, the stacks must be well topped with slough grass, covered with tarpaulins or boards, or given other protection. It is better still to put the alfalfa intended for seed into a barn. One western Kansas farmer reports that he used a self-binding harvester, shocked the sheaves like those of grain, let them stand ten days, and then put in a mow, with no bad results.—From Coburn's "The Book of Alfalfa."

Imported Merinos for Colesberg.

The following details of recent importations of Merinos from Australia for Mr. Abe Bailey's extensive farming propositions at Colesberg, will be of interest to sheepmen:—Special stud ewe No. 3 Eskvale, bred by Eskvale Estate. Sired by Sylvan, sold at auction, Sydney, 1908, for 800 guineas and since resold for South America for 1000 guineas. Dam by Harmony by Survivor by Primus by President, two years old in July, 1909. Was grand champion ewe at Campbelltown Special Show, Tasmania, 1909. Special stud ewe C.B.G. 3910. Bred by C. B. Grubb, "Strathroy," one year old in May, 1909. Sired by Young Kitchener by Lord Kitchener by Primus by President. Dam by Enterprise, granddam by Young Royal Hero (sold for 700 guineas), by Royal Hero. This ewe won first prize in her class at Campbelltown Show, 1909, and first prize at Sydney Show, 1909, as best robust ewe one year old. Four special stud ewes, bred by Bellevue Estate, two-tooth. No. 95, sire Reformer, by Young Clinker by Clinker by Buffalo Bill by Vice-President by President. Dam a Bellevue first stud ewe. No. 96, sire Clipper, by Clinker 5th by Clinker by Buffalo Bill by Vice-President by President. Dam a Bellevue first stud ewe, No. 97, sire Chieftain 2nd,

by Chieftain by President 2nd by President, dam a Bellevue first stud ewe. No. 98, sire Chieftain 2nd. by Chieftain by President 2nd by President, dam a Bellevue first stud ewe. Five special stud ewes—4 tooth, bred by John Taylor, Winston, Tasmania: J.T., No. 41, sire son of Magician 2nd, No. 264; J.T., No. 42, sire Magician 3rd, No. 238; J.T., No. 47, sire Magician 3rd, No. 238; J.T., No. 51, sire Magician 4th, No. 214; J.T., No. 52, sire son of Liberator, No. 230. Son of Magician 2nd, No. 264, is one of the Winton sires now doing service in the stud. Liberator was by Primus, grand champion New South Wales Sheep-breeders' Show in Sydney, 1896, and strong wool champion at the same Society's Show the following year. Four special stud ewes, 2-tooth, bred by Wm. Officer, Zara by Zara, by special stud rams, dams special stud

Importation of Pigs and Sheep from Cape Colony into Rhodesia.

It is notified for general information that *Swine* from this Colony will in future be admitted into Rhodesia under a permit issued by the Chief Inspector or Examiner of Stock, Rhodesia, and subject to any examination and quarantine on entry that may be deemed necessary, and to such other conditions as it may be considered expedient to impose.

Sheep and *Goats* exported from this Colony, except from the Districts hereafter enumerated, to Rhodesia require to be accompanied by a declaration, signed by the exporter before a Resident Magistrate, Sheep Inspector, Government Veterinary Surgeon or Police Officer, to the effect that they are free from any contagious disease, including scab, have not been in contact with any infected animals during the preceding six months and were dipped within ten days of reaching Rhodesia.

From the following Heartwater-affected Districts, viz.:—Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, King William's Town, Komgha, Peddie, Somerset East, Stockenström, Uitenhage, and Victoria East, sheep and goats can only be imported into Rhodesia under a special permit, to obtain which the exporter must forward to the Department of Agriculture, Salisbury, a certificate signed by a Government Veterinary Surgeon as to the health of the animals and the locality from which they come.

Lucerne for Honey.

Alfalfa-raisers find it to their advantage to have a few stands of bees. As the original cost is slight and the bees provide their own food, go after the raw material for the manufacture of honey, demand but slight attention, and make such bountiful returns, bee culture has come to be a valuable "side line" for the farm. As blooms are to be found in alfalfa districts every day from early May to late October, the bees have a constant opportunity for service. Alfalfa honey is white and clear, in an extremely delicate comb, has a delicious flavour, and an aroma that is delightful. One authentic report from a western Kansas county is of a single hive that contained nearly two hundred pounds, and of another having ninety-six pounds. The owner of these had twenty-five acres of alfalfa, which in one year yielded him over one hundred tons of choice hay, besides the honey. The next year he increased his apiary to fifty stands. While the average yield per hive elsewhere varies from fifteen to thirty pounds, the average in the alfalfa-growing territory is far higher. Thus the financial returns of alfalfa may be greatly increased and in some

instances doubled by having, say, two colonies of bees for each acre. Or, if only a part of the alfalfa-raisers in a neighbourhood kept bees, this ratio could be doubled or trebled by those who do. Unlike other trespassers on neighbours' fields, the bees do the neighbours a distinct favour by fertilising their alfalfa.—From Coburn's "The Book of Alfalfa."

Ensilage Deadly Poison to Horses.

Mr. W. H. Greaves, of Zuiverkraal, Tafelberg, writes:—In November, 1907, Mr. R. Paine, F.R.C.V.S., of Elsenberg, at the request of Mr. Versveld, of Moutons Vlei, Piquetberg, reported upon the loss of eight horses and eight mules that died from silage. On reading Mr. Paine's report one gathers that it was through using bad ensilage that the animals died. He also mentions that horses have died in England. One is, nevertheless left under the impression that ensilage may be all right as a feed for horses if properly matured (about one month after pitting). Mr. Versveld in December, 1907, also in the *Agricultural Journal*, comments upon Mr. Paine's report, and says: "I consider Mr. Paine does not make the above sufficiently clear in his report—in fact, his report is no caution at all," etc. Now, I have just had somewhat the same experience as Mr. Versveld. I fed four horses, two mules and one bull on mealie ensilage eight months old, and lost four horses and one mule; the bull got fat. This is my first attempt at making ensilage, so I am no judge of its quality. It is, however, good for cattle. I look upon ensilage as a most deadly poison to horses and mules, and would warn anyone having no experience to beware. As Mr. Versveld's is the only case I have heard of, and seeing that ensilage is, no doubt, largely used, it seems strange that more casualties have not been reported. It is not generally known that ensilage is dangerous, as I mentioned my experience to many farmers, who were surprised to hear it. I hope, therefore, by publishing my experience it may prove of value to others.

Government Grants to Agricultural Societies.

The following regulations have been gazetted, as governing the payment of grants to Societies or Associations towards prizes at Shows or competitions and in aid of permanent improvements in or to showyards and premises:—

1. For the purpose of these regulations a Society shall mean any combination of persons not less than 25, organised for the purpose of holding periodical shows or prize competitions of livestock, agricultural produce of all kinds, agricultural machinery and appliances and products of home industries; such shows or competitions to be open to the public under regulations to be framed by the Society.

2. The funds provided by Parliament for Grants to Societies and Associations shall be applied in the following manner, and not otherwise, that is to say:—

A. *As Grants for Prizes at Shows.*—The funds provided for this purpose shall be paid out to the various Societies holding shows, approved by the Secretary for Agriculture, during the year for which such funds are available, on the basis of a distribution as nearly as possible *pro rata* to

the amount of prize money actually awarded and paid out in classes recognised under these regulations at each such Society's last preceding show, or, where no previous show has been held, to the prize money awarded and paid out at the show in respect of which a grant is desired by the Society; provided:

1. That the sum so contributed by the Government shall not exceed five-eighths of the total amount awarded in prizes at the show, towards which such contribution is made, for the various classes recognised under these regulations, and that the sum payable to any one Society in one year shall not exceed one-eighth of the total sum provided for this service.

2. That prizes in respect of which the Government Grant is awarded shall be paid only for:—

- (a) The following classes of livestock, viz.:—Horses, Mules, Donkeys, Cattle, Ostriches, Sheep, Goats, Pigs, and Poultry.
- (b) Agricultural Produce of all kinds.
- (c) Agricultural Machinery and Appliances, including farm vehicles.
- (d) Such products of home industries as the Government may approve.

3. That no grant shall be paid towards more than three separate shows in any one season in respect of the same exhibit in sub-head 2 (a).

4. Payment of such grants shall be authorised upon production to the Civil Commissioner concerned by the Society's duly authorised officer of proof that the Society is duly qualified for a grant under these regulations, and that payments in respect of which the grant is applied for have been actually and *bona fide* made by the Society; provided that the Civil Commissioner may, in lieu of proof that the payment has been made, accept the declaration upon oath of the President or Chairman of the Society that such and such an amount has been awarded in prizes, and will be paid to the respective prize-winners upon receipt of the Government contribution and that receipts for payment from prize-winners will be produced when payment has been made.

Further, a declaration on oath by the same official of the Society shall be produced to the Civil Commissioner to the effect that the condition imposed under Sub-head 3 has been complied with.

5. For the purposes of this Sub-division (A), the word "show" shall include "competition."

B. As Grants for Permanent Improvements in or to Show Yards and Premises.—1. Whenever funds shall have been provided for this specific purpose, such funds may be distributed on the basis of a contribution on the £ for £ principle towards the cost actually and *bona fide* incurred upon the construction or purchase of buildings or other permanent improvements to or requirements for show grounds or show premises, to such Societies as shall have submitted their applications to Government before the 1st January of the financial year prior to that in which such contribution will be made and shall have received approval thereof. It shall be distinctly understood that the Government will not recognise any claim for a grant, out of the funds provided, towards the cost of any improvements which shall not have received its previous approval in writing.

2. Should any Society, which shall have received contributions from Government funds towards buildings or other permanent improvements or requirements, at any future time cease to exist or discontinue the holding of shows, the right shall be reserved to the Government to claim one-half of the proceeds of sale of such buildings, etc.

The Life of Lucerne.

Alfalfa (Lucerne) is very long-lived; fields in Mexico, it is claimed, have been continuously productive without replanting for over two hundred years, and others in France are known to have flourished for more than a century. Its usual life in the United States is probably from ten to twenty-five years, although there is a field in New York that has been mown successively for over sixty years. It is not unlikely that under its normal conditions and with normal care it would well-nigh be, as it is called, everlasting.—From Coburn's "The Book of Alfalfa."

Supply of Carp and Trout.

Carp, Trout Fry or "Eyed Ova" will be supplied from the Jonker's Hoek Trout Hatchery, Stellenbosch, on application. All correspondence relating thereto must be addressed to the Under Secretary for Agriculture, Cape Town. The actual notice of the despatch of any consignment will, however, be sent from the Hatchery by the Curator. Applicants are requested to give their addresses in full, and also to name the railway station to which the Carp, Fry or Ova are to be consigned, and, in the event of the Trout Ova having to travel by post cart, applicants are requested to state the nearest post office to their farms or homes, number of hours occupied in journey from post office to destination and days of week that mails are received at the nearest office.

Carp will be supplied at 10s. per dozen and *Trout Fry* at a charge at the rate of £2 (two pounds) per thousand, when available, *payment to be made in advance*. Government responsibility for Carp and Fry will cease on delivery at Stellenbosch Railway Station. *The purchase of fry is not recommended on account of the risks attending transport.*

In the case of both Carp and Fry, an additional charge of 5s. will be made for transport to Stellenbosch, together with 6s. for the carboy or carrier in which the fish are forwarded; the latter amount will be refunded on return of the carboy (which may be sent back *free* if marked "Returned Empty") intact to the Railway Station at Stellenbosch.

Trout Ova (eyed ova), packed in moss, will be forwarded by Parcel Post to any address in the Colony at a charge of £1 (one pound) per thousand, in addition to a charge of 5s. to cover cost of packing, postage, etc., per parcel containing from 1,000 to 3,000 ova. *Payment to be made in advance.*

The breeding season for Carp is from November to December and that for Trout from May to September.

Remittances may be made by money order, postal note or bank draft, payable to the Under Secretary for Agriculture, Cape Town.

Hatching Boxes, designed by the Curator of the Hatchery and capable of hatching up to 3,000 Fry, may be obtained from Mr. William Low, 64, Dorp Street, Stellenbosch, at a charge of £1 15s. (one pound fifteen shillings), delivered on the railway; payment to be made to Mr. Low direct and the remittance to accompany the order.

These boxes will be personally examined by the Curator before despatch.

Printed pamphlets containing full instructions relative to the transport of Fry, hatching of ova, or construction of hatching boxes, will be forwarded *free of charge* on application to the Department of Agriculture, Cape Town.

Scientific Viticulture and Horticulture in Germany.

On account of the depression the red wine viticulturists of the Ahr and Rhine valley approached the Government of the Rhine Province with a view of having a provincial Viticultural and Horticultural School erected. It was hoped to bring about improvement in local circumstances in the course of time by means of such an institution. The school was opened in October, 1902, at Ahrweiler. In an annual report, October, 1905--October, 1906, the director, Mr. H. Braden, says that first of all the most attention was paid to the gathering of the grapes (vintage); as being the basis of the cellar-work and the nature of the wine being specially dependent upon it. Attention was drawn to this by means of lectures, courses, and practical demonstrations. The result has been that the vignerons perform this work with more care and caution. During the last ten years the red wine drinking public has developed another taste, mild, soft red wines pleasing to the taste being preferred to the acid ones. In order to obtain such wines it was proposed to stalk the grapes. Notwithstanding all sorts of objections to this novelty, it has already become general, their being 40 machines for that purpose in the school district. The same has been the case in regard to the method of fermenting. The institution has also made experiments with the pressing of wine, and these methods, as well as those with regard to pruning, etc., have been followed by the farmers.

Horticulturally, the school has also been of enormous benefit to the farmers. The school aims at giving a thorough theoretical education to the sons of vignerons, horticulturists, and agriculturists. At the same time, the whole of the education tends to make them thorough practical men. For that purpose the school is provided with all the modern educational material, but there are also lands available for practical education. For instance, there are 7 morgen of vineyards; and the cellar-work is taught, there being in the cellar of the institution 90 "Fuder" of wine, treated only by the pupils; besides 36 "Fuder" of experimental wines. There is further a garden of 8 morgen, where, besides horticulture, fruit culture, etc., experiments are made with such farm plants as rye, barley, oats, potatoes, clover, etc. Besides these, two other plots of 18 acres have been obtained for that purpose. In another part of the Ahr valley land was hired for experimental purposes in order to teach the farming community. Manuring and other experiments are made. Further, there are available various gardens and lands in the district to teach the pupils everything in connection with arboriculture, etc. It appears from the report that the pupils visit various places of interest for those who intend to become agriculturists, horticulturists, etc. From the questions at examinations, it appears that the pupils are well grounded in all knowledge necessary for the successful performance of their duties as farmers, including that of diseases, etc. A course was also established for the gathering of grapes for women and girls, which was attended by 51 persons. The institution has a library of popular books on the various branches of knowledge which are imparted at the school. Also various collections of instruments, etc. A foreigner wishing to become a pupil has to pay in school fees 100 marks annually. In case he is allowed to become a resident boarder he has to pay 450 marks (shillings) annually for boarding, lodging, and school fees together. This amount has to be paid quarterly in advance. Leave to become a pupil is to be obtained from the "Landeshauptmann" of the Rhine Province. (That is, the head of the local Provincial Government.)

Rejection of Cape Fruit in the Transvaal.

Sorting for Codling Moth.—Shippers of fruit to the Transvaal are reminded that the restrictions of last year to exclude Codling Moth, Scale Insects, Fusicladium, and other pests and diseases are still in force. The work of inspection is now more thorough and better systematised than it was a year ago, and no consignment not fully up to the required standard of cleanliness has much chance of securing admittance. On the other hand, there is no chance that a consignment fully up to standard will be rejected. The custom is for the inspectors to open one-tenth of the packages, and to scrutinise every fruit in such. In the case of most troubles, the presence of less than one affected fruit in a hundred is permitted. Decay in oranges and other citrous fruits is overlooked if under one fruit in twenty-five is affected, and scale insects on these fruits are passed by if not more than ten specimens are found on five per cent of the fruits. Common scale insects on deciduous fruits are supposed to be disregarded, yet a few consignments of apples were stopped for Red Scale last season. The presence of Fruit Fly maggots is ignored unless the percentage of infested fruit is considerable. Objection is still taken to Codling Moth if one fruit in a hundred is found infested, and apricots, plums, peaches, pears, apples, and quinces are all liable to rejection because of this pest. Consignments for Johannesburg and Pretoria are generally inspected in the railway yards at those places, and consignments for other points are, as a rule, dealt with at the border stations of Vereeniging or Christiana.

The Cape Department of Agriculture obtained a promise late last season that fruit infested with Codling Moth to a less extent than five in one hundred would be admitted at Johannesburg if satisfactorily sorted and the affected fruits destroyed. Negotiations since to induce the Transvaal Department of Agriculture to undertake the sorting, as it does in the case of potatoes, have utterly failed; but the Cape Department has finally succeeded in making arrangements to undertake the work itself, and has leased and is fitting up a building for the purpose. It is expected that everything will be in readiness for the work before the middle of January. Every detail must be satisfactory to the Transvaal Agricultural Department, and the salary of an officer of that Department, who is to supervise the actual sorting, will have to be paid by the Cape. The expenses are, therefore, expected to be much heavier than were the Transvaal Department of Agriculture to attend to the work in direct connection with its inspection; and it is anticipated that, notwithstanding the levying of what will doubtless be regarded as very high charges, the operations for the season will be conducted at a considerable loss to the Cape Government. Mr. Alfred Webb, Agent for the Sale of Cape Produce in the Transvaal, has been engaged as the Cape representative, and will attend to the collection of fees and the issue of sorting orders. His address is P.O. Box 2342, Johannesburg. The following scale of fees has been adopted:

For case of 50 fruits or less	3d.
„ 51 to 125 fruits	6d.
„ 126 to 200 fruits	9d.
„ 201 to 300 fruits	1s.

and 6d. extra for each 100 or portion thereof above 300.

In addition, the owner of the fruit must pay for any extra cartage that may be involved, and must take all risks of damage or loss by fire or theft. Infested fruits will be removed and destroyed, so he will also lose these.

The Johannesburg market is expected to be a good one for fruit this year, as the disabilities on sales at retail imposed last season through the law requiring the early closing of shops have to a large extent been removed, and as the pest restrictions will doubtless continue to prevent many parties from forwarding consignments. The pest restrictions are in reality a substantial boon to careful shippers, and this at the expense of the populace of Johannesburg and other Transvaal towns. Dealers admit that some strong lines, in particular mid-season pears, sold at wholesale last season for more than double what they would have expected to fetch in the absence of the restrictions. The advantage of this condition of affairs has so far fallen almost wholly to a few large growers and a number of speculators, because the mass of the growers were too timid to face possible rejections. It is hoped that small growers will have more courage in the season now at hand, and it is chiefly to help them that the Cape Department of Agriculture has gone to such trouble to secure a system of sorting consignments slightly infested with Codling Moth.

The price of success in getting produce admitted is entirely a matter of care. No unsound or over-ripe fruit of any kind should be forwarded, nor any fruit which is in any way blemished by disease, or by an insect which is still present. It is absolutely unavoidable that much fruit will come from the orchard that is below the standard insisted upon by the Transvaal, but all such fruit—or practically all of it—can be rigorously excluded from a shipment intended for the Transvaal; and to be quite on the safe side fruit that might be mistaken as being diseased should also be excluded. The large fruit companies succeeded very well in meeting the requirements last year, and what they have accomplished under salaried supervision can surely be equalled by the small farmer, who can have the fruit he wishes to send to the Transvaal sorted under the personal supervision of some trusted member of his family.

The greatest trouble in the past has been over the Codling Moth. Contrary to a popular impression, the inspectors count a fruit as infested only when there is an entire absence of doubt, but one per cent. or over was found by them last year in a great number of cases in which the shippers had evidently striven hard to sort out all infested specimens. This was specially true in regard to Bon Chretien pears, and the fault in the case of this fruit was very often due to failure to examine the stem end sufficiently closely. The variety ripens when a summer brood of the insect is at work; and when it attacks this fruit towards maturity, the larva is very likely to enter the crease near the stem. Occasionally an egg is to be found on the fruit, but in most cases one would be overlooked both by the shipper and the inspector. Still the packer should be on the watch, and remove any noticed. The egg is a whitish, broadly oval, scale-like body nearly as large as a pin head. Infested fruit ripens up more quickly than sound fruit, so any fruit more advanced than its fellows should be examined with special care. Infestation that is not readily detected at

the time of packing the fruit may become very distinctly evident in a few days. Therefore it is to the shipper's interest to forward his fruit as soon as practicable after it is sorted, and to do what he can to guard against delay in its being inspected. Fruit that arrives on Saturday morning at Johannesburg may not be inspected until Monday, by which time much more Codling Moth infestation may be superficially obvious.

The Sorting.—The privilege of having the consignment sorted if one to five per cent. only of Codling Moth be found at the official inspection should remove much of the fear which shippers now have that their sendings will not gain admission. It remains highly important, however, that the sender exercise the care recommended above in selecting his fruit. The aim should invariably be to get the quantity of infested fruits well within the one per cent. limit of grace. Although it is probable that the sorting at Johannesburg will be done by white women in order to lessen the risks of injury, there is no doubt that however great the care used the extra handling will decrease the life of the fruit and will materially depreciate its market value by marring the appearance of the pack.

Return of Consignments.—As in the past year, owners will be allowed to have consignments rejected for most causes sent back to the Colony. All shippers who wish to avail themselves of this concession should keep their agents under standing instructions as to where to ship their rejected consignments, as if not removed within forty-eight hours such are liable to confiscation and destruction. Fruit infested to a greater extent than fifteen per cent. with Codling Moth is confiscated at the time of inspection. Whether fruit infested with one to five per cent. is re-consigned or sorted is optional with the owner. Fruit rejected for any other cause than Codling Moth does not share in the sorting privilege.

WESTERN PROVINCE BOARD OF HORTICULTURE.

MINUTES of Quarterly Meeting of Western Province Board of Horticulture, held at Parker's Buildings on 3rd Dec., 1909.

Present:—D. de Vos Rabie, T. Micklem, W. H. Lategan, E. Pillans, C. P. Lounsbury, S. W. Joubert, P. R. Malleson, C. W. H. Kohler, J. P. Louw, L. Cloete. Mr. Micklem was voted to the chair.

Minutes of the last quarterly meeting and of the special meeting held on 18th November, were read and confirmed.

Correspondence.—Letters were read from the Agricultural Department, on the subject of the Bill to provide for the compulsory inspection of export fruit, publication of information *re* Almeria Grapes and Closer Union of existing agricultural organisations.

Board of Agriculture.—In connection with the last subject the Secretary submitted the minutes of the meeting between representatives of the W.P. Board of Horticulture and the Executive of the Agricultural Union. On the motion of Mr. Kohler, seconded by Mr. Malleson, the minutes were confirmed, and it was resolved to send copies to the various Associations, with a recommendation that same be accepted.

Crates for Packing Grapes.—Letter was submitted from the Agricultural Department, with reference to crates for packing grapes. It was resolved to point out that the sizes of crates recommended by the Trades Commissioner did not correspond with the standard boxes; they should be either the same size as the standard boxes or some multiple as regards length and breadth, otherwise space would be wasted in stowing.

Standard Weights for Conveyance by Rail.—Mr. Kohler submitted copy of letter which had been addressed to the Railway Department by the Paarl Farmers' Association on the subject of standard sizes for boxes and baskets for conveyance of grapes by rail, viz.:—Boxes, 65 lbs., and Baskets 55 lbs. It was resolved to re-affirm the resolution on the subject previously passed and to draw the attention of the Railway Department as to the necessity for strictly enforcing the regulation.

Wine Show.—The Secretary submitted the following report on the Wine Show:—The entries for the Wine Show were not so numerous as last year, totalling 134 as against 238. This is no doubt accounted for by the difference in date and the fact that no money prizes were offered. In addition to the samples entered for competition, a very interesting collection of Colonial-made and Imported wines was put on exhibition by the Government Wine Farm.

The attendance of wine-farmers was fair, but not as large as might have been expected.

Dr. Hahn, Messrs. F. S. Green, and T. L. Watermeyer, kindly officiated as judges.

I personally inspected the majority of the prize-winners' stocks, and satisfied myself that they had the required quantities, bringing away samples, which Mr. Green kindly compared with the original samples and declared identical. Mr. Rathfelder was out when I visited his farm; I therefore asked Mr. Watermeyer to inspect. Mr. Watermeyer's report is attached. I was unable to arrange a visit to Mr. Lange's farm, and submit a declaration from that gentleman. Letter is also submitted from Klein Constantia Estate, forfeiting the awards they gained in certain classes. Under these circumstances, I did not visit the farm in question. The analyst's report on the various prize samples is annexed.

The Secretary was instructed to disqualify any wines which exceeded the limits laid down for alcohol and volatile acid. It was decided that "Sauterne" should be classed as a light wine. The Secretary was instructed to convey a formal vote of thanks to the judges for their services. Mr. Kohler suggested that next year the members of the Board might arrange to inspect the stocks of wines of the prize-winners in their respective districts.

Raisins and Dried Fruit Show.—Correspondence on the subject of holding a Raisin and Dried Fruit Show was read from the Cape Town Chamber of Commerce, also a letter from the Government promising £200 towards the expenses of the Show, and suggesting that the event should be held in Cape Town.

After discussion, it was decided to hold a Raisin and Dried Fruit Show in Cape Town about the same date as the previous Show.

The previous Committee was re-appointed.

It was decided to give the Cape Town Chamber of Commerce an opportunity of appointing another representative if they so desired.

Advertising Cape Produce in England.—Letter was read from the Under Secretary for Agriculture, with reference to the resolution passed at the Annual Congress on the subject of advertising Cape produce in England, stating that the Trades Commissioner in London was being consulted and that a further communication would be made at a later date.

Granulated Cork.—Letter was submitted from the Cape Cork Industries Ltd., offering to supply granulated cork for packing fruit at £12 per ton of 2,240 lbs.

Grafting of Pontac Vines.—Mr. Kohler brought up the question of grafting pontac vines and suggested that the Government be asked to make more extended experiments at Constantia and in other districts. It was resolved first to ask the Government for full information as to what was being done, so that the matter could be discussed at the next meeting.

Cold Storage Experiments.—Messrs. Malleson, Lategan, and Micklem were deputed to interview the Under Secretary for Agriculture with reference to cold storage experiments during the coming season.

WHEAT HYBRIDISATION.

REPORT ON FIRST SOUTH AFRICAN WHEAT HYBRIDS.

By R. W. THORNTON, Government Agriculturist.

Bread being known as the staff of life, it is felt that whatever labour is spent on increasing the wheat supply not only for this Colony but for the whole world is a work of which the benefit cannot be overestimated. Cape Colony or rather South Africa does not at present produce anywhere near the quantity of wheat that should be produced seeing the amount of suitable soil available for this purpose. As will be seen from the following figures, some time must elapse before sufficient wheat is grown in the Colony to make it self-supporting as far as this article of food is concerned. The wheat imported into the Colony during 1899, that is just before the war, amounted to 196,398,520 lbs. and wheaten-flour 19,434,595 lbs. Skipping the abnormal years during the war and taking the imports from 1905 up to date it will be seen when compared with the actual production for 1909 that the wheat production must be more than doubled before sufficient wheat is produced for our own requirements, let alone exporting.

Statement shewing Quantity of Wheat and Wheaten Flour imported into the Colony, and the amount produced in 1909.

Period Year.	Wheat.		Flour—Wheaten.	
	Quantity.	Value.	Quantity.	Value.
	lbs.	£	lbs.	£
1904	172,801,395	507,133	37,360,781	160,981
1905	331,523,844	993,804	40,493,719	189,844
1906	315,065,266	919,917	40,780,062	160,009
1907	281,458,712	813,687	39,019,451	134,096
1908	216,191,239	811,280	35,237,139	171,135

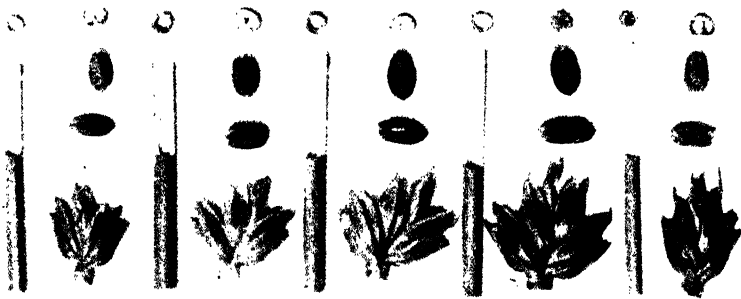
Estimated yield for 1909 : 214,986,800 lbs.

A great deal has been written just lately on the growing and export of mealies. There is no doubt that this is an important industry, but when the mealie is compared with wheat from which we make our bread, the fact that wheat is far the more important must appeal to everyone. One of the principal drawbacks to wheat growing in Cape Colony and more especially in the Western Province of the Colony is the vast amount of destruction caused by rust every year, in fact this destruction became so

bad at one time that the farmers almost despaired of making wheat growing a success. The importation of various so-called rust resistant varieties by the Government has assisted the farmers to a great extent as several varieties have been found to stand fairly well in certain districts. One of the best known of these is Rieti which, however, is not a good milling wheat, and also if allowed to become too ripe is apt to shed, more especially if any high winds occur during the harvesting season. Another wheat that has found favour is Gluyas Early. This wheat is a far better milling wheat than Rieti and gives an excellent yield and never sheds. One of the principal drawbacks to Gluyas is its weak straw. Now, though a certain amount of assistance has been rendered by the importation of scores of new varieties over and above those mentioned, it has finally been decided that the way to produce a wheat really suitable to this country as far as rust resistance, etc., are concerned, and also with regard to the milling qualities of the wheat, is by hybridising. This has accordingly been carried out for some years, with the result that next season a certain amount of wheat will be available from the first hybrids grown. The breeding of a pure wheat hybrid takes a considerable amount of time, labour and close attention. The operation of cross-fertilisation, though tedious, is the least of the work, and it is the selection that follows which requires judgment and experience. Here, as with other plant breeding, we have first to select an ideal, and work accordingly, and the man who carries out the work must fully realise what qualities he is seeking for, and have the knowledge to enable him to recognise these qualities and work accordingly. It is unnecessary here to go into detail as far as hybridising is concerned as this will be of little value to the farmers without actual ocular demonstration, so that only some of the principal points are mentioned. In crossing the varieties illustrated, the objects in view were, first and principally, rust resistance, secondly yield and milling quality. Drought resistance was a point that was not considered to any great extent. The great advantage of hybridising is shown in three effects. It makes possible the combination of the qualities of two different varieties, it greatly increases the variety and so increases the possibility of selection to a far greater extent, and imparts vigour to the offspring. This is clearly demonstrated in the plates, where, none of the parents, though grown under exactly similar conditions, are as healthy as the hybrids. After selecting the plants which it is intended to hybridise, a certain number of spikelets on each ear is removed, leaving only the best and strongest. The florets are then emasculated and the pollen or male element is taken from another wheat and introduced into the emasculated florets. This is a process which takes a great deal of time as it is necessary to do it all by hand, as with wheat self fertilisation by natural means only takes place. This can be noted from the fact that even if wheats are sown side by side in a field no natural cross-fertilisation takes place. The larger the number of grains dealt with the greater the chance of obtaining a valuable variety, as it is quite likely that only one individual out of hundreds may have the power to produce a valuable strain. Such individuals are often termed the "Shakespeares" of the species, and the great labour of eliminating the useless from the good by selection is many times as great as that of the actual hybridising. The usual method is to plant the seeds that are to be tested individually in rows, the rows preferably being far enough apart to enable a man to pass between them without injuring the plant at the time of selection. If possible 100 seeds from the most promising plants are again planted, and these seeds from a single parent are called "centgeners." By means of selecting, a wheat can thus be bred true to type or will become practically a fixed type in four generations. At any rate the type should then be



Darling. Union A. **PLATE 1.—(Reduced.)**
 Union B. Union C. Gluyas



Darling. Union A. **PLATE 2.—(Natural size.)**
 Union B. Union C. Gluyas.



Darling. Darlvan A. **PLATE 3.—(Reduced.)**
 Darlvan B. Darlvan C. Van Niekerk.

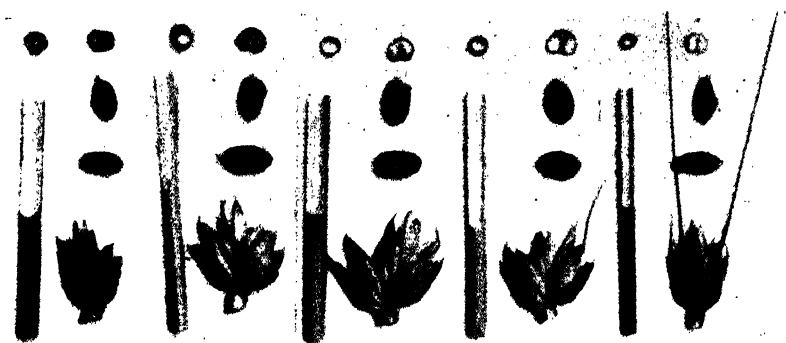


PLATE 4.—(Natural size.)
 Darling. Darlvan A. Darlvan B. Darlvan C. Van Niekerk.



PLATE 5.—(Reduced.)
 Gluyas. Nobbs A. Nobbs B. Nobbs C. Du Toit.

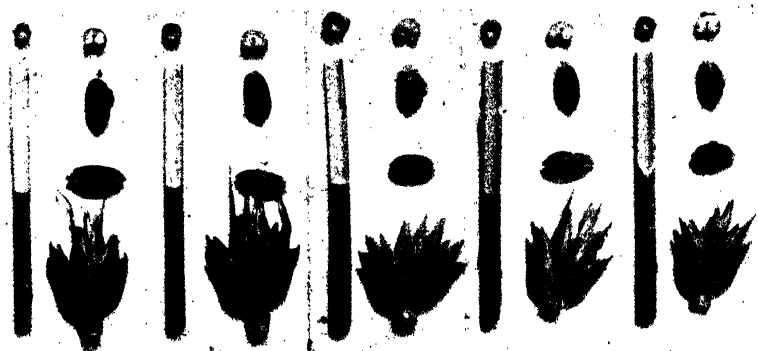


PLATE 6.—(Natural size.)
 Gluyas. Nobbs A. Nobbs B. Nobbs C. Du Toit.

so fixed and uniform that very little variation will be noticeable in the field. The breeding of rust-resistant wheats will in the future be carried on to a much greater extent, because even if a rust-resistant variety is procured for one district, it may not prove successful for another, and the parents that give this variety may prove wholly unsuitable for the same purpose in another district. Without going into details on the fungus rust, it is impossible to give the reasons why. One of the principal reasons undoubtedly is temperature, hence a parent that has proved most desirable in England has been found utterly useless in India when subjected to the high temperature of that country. This point and many others must be borne in mind when selecting parents for future hybrids. Out of a great number of wheats hybridised only three hybrids of any value have been procured. The one which promises to be the most valuable of these three has been called *Union* wheat, as it is believed that this is the first hybrid bred up to a standard type in South Africa. Plate No. 1 shows this *Union* wheat with the two parents. The parents, *Darling* wheat and *Gluyas*, were crossed for the following reasons: Though *Gluyas* had proved an excellent wheat in practically every respect it was found that the straw was exceedingly weak. *Darling*, on the other hand, has an exceptionally strong straw. These two were crossed, and as will be seen by Plate 2 the straw of the hybrid is stronger than that of the *Darling* itself. The Hybrid from this cross has been divided into *Union* variety A, B and C, and has been selected accordingly. The only material difference in these three is that A ripens the latest of the three, shewing that it leans towards *Darling*, which is not as early a wheat as *Gluyas*. C again ripens earliest, in fact quite as early as the parent *Gluyas*. A remarkable point is the robustness of the hybrids, as will be seen from Plate 1. The ears are quite double the size of those of the parents, and the spikelets contain each four grains, whereas *Darling* only contains two and *Gluyas* three to the spikelet, so that the hybrid promises to be a most prolific wheat. As far as rust resistance is concerned, this wheat has so far proved absolutely resistant, after this its third year of growing, and next season, which makes the fourth, a sufficient quantity of grain, it is hoped, will be procured for distribution throughout the country. Plate 3 illustrates the *Darling-Van Niekerk* cross. The hybrid here has been named *Darlván*, and though an excellent wheat is not to be compared with the *Darling-Gluyas* hybrid. It is feared that this wheat will not prove absolutely rust-resistant, though excellent in other respects, more especially as far as yield is concerned, and it will therefore be tried on a large scale in the *Karoo* owing to its productiveness. On Plate 3 it will be noticed that the hybrid A or *Darlván* variety A is not unlike the parent *Darling*. *Darlván* B is almost an exact cross between the two parents whereas *Darlván* C is more like the parent *Van Niekerk*, which is a bearded wheat. The short awns on B and C shew the leaning towards the *Van Niekerk* type. In this instance rust resistance was not so much the aim as the production of a really first-class yielder and milling wheat, *Van Niekerk* and *Darling* both being excellent in these respects but *Darling* being the better yielder. By examining Plate 4, it will be seen that there is very little difference as far as the straw is concerned, but that the hybrid C gives the better milling wheat, but hybrid B will probably prove the best all-round wheat, including yield. Plate No. 5 shews a cross between *Gluyas* and *Du Toits*, *Gluyas* again being the rust-resister and *Du Toits* being probably the finest milling wheat we have in the Colony. The three hybrids have here been named *Nebbs* variety A, B and C. B is here again the best of the three, being almost an exact cross between the two parents, whereas A and C lean towards the parents next to which they are placed respectively. Unfortunately colour cannot be shewn in the photographs otherwise it

would be seen that in colour of husk and grain B in the case of all three hybrids is almost an exact cross, whereas A and C have the colour more or less of the parents. This wheat, the Gluyas-Du Toits cross, also promises well as a wheat for the Karroo, and should be of exceptionally high milling quality, though this quality could not be tested thoroughly by the best method, namely grinding and baking, owing to the limited quantity available, but the grains were merely cracked and cut in the usual method.

The importance of wheat hybridising is so great that it is hoped to devote a great deal of time to this branch of work in the future. Mr. Visser, the Manager of the Robertson Experiment Station, had the supervision and caring for the hybrids mentioned, and the work was most carefully carried out.

SHOW DATES, 1910.

The following corrected list of show dates for 1910 is supplied by the secretary to the Agricultural Union (Mr. A. A. Persse, Parker's Buildings. Capetown):—

Paarl : January 27.
 Stellenbosch : February 3.
 Bayville : February 4.
 Robertson : February 9.
 Caledon : February 11.
 Ceres : February 15.
 Britstown : February 15 or 16.
 Queenstown : February 15 and 16.
 Malmesbury : February 17.
 Beaufort West : February 17 or 18.
 Rosebank : February 22, 23, 24, and 25.
 Molteno : February 23 and 24.
 Bathurst : February 24 and 25.
 Aliwal North : March 8 and 9.
 Graaff-Reinet : March 1 and 2.
 Middelburg : March 3 and 4.
 Dordrecht : March 4 and 5.
 East London : March 4 and 5.
 Cradock : March 8 and 9.
 Cathcart : March 8 and 9.
 Grahamstown : March 10 and 11.
 Port Elizabeth : March, 15, 16, 17 and 18.
 Humansdorp : March 9 and 10.
 Johannesburg : March 29, 30, 31, and April 1.
 Oudtshoorn : March 30 and 31.
 Bloemfontein : April 12, 13 and 14.

EAST COAST FEVER.

ALSO KNOWN AS RHODESIAN REDWATER AND TROPICAL PIROPLASMOSIS.

By R. W. DIXON, M.R.C.V.S., Government Veterinary Surgeon, Cape Colony.

This disease which at the present time is menacing our Natal border is of great importance to this Colony as the future welfare of our cattle industry and indirectly the agricultural prospects of the Native Territories are seriously endangered.

In view of this danger, which is so close to us in Natal, and the manner in which East Coast Fever is spreading in that Colony, it is deemed advisable for the information of our stock owners to issue a statement dealing with the nature, causation and preventive methods which have proved most effective in dealing with this disease.

East Coast Fever may be defined as a specific febrile disease peculiar to bovines only, caused by a special parasite which invades the red cells of the blood. The organism, which until recently has been known as *Piroplasma parvum*, differs markedly from the other piroplasms in many respects, so much so, that it is now considered that the East Coast Fever parasite is not a proper piroplasm although it had been previously described as such, and for this reason another genus has been made for it to which the name "Theileria" has been given.

The disease is not directly contagious, but is conveyed naturally only by means of ticks, and these ticks only become infective by sucking the blood of a sick animal.

HISTORY.

The disease was first described by Koch in 1897, when seen by him in German East Africa, although he at that time considered the parasites found in the blood of affected cattle to be young forms in the development of the Redwater organism (*Piroplasma bigeminum*). In 1901 the disease broke out in Rhodesia. A cargo of cattle from Australia had during that year been landed at Beira, and owing to delays on the railways, were detained on the Beira flats for several weeks. During that time several became sick and died of Redwater. It is popularly thought that this cargo of cattle contracted East Coast Fever at Beira and, upon being shifted to Salisbury and Umtali, brought the disease in to Rhodesia. Such is not the case. It has been proved that East Coast Fever was first introduced into Rhodesia at Umtali by some slaughter cattle which had come from German East Africa via Dar-es-Salaam and Beira, and it was only after the arrival of the Australian cattle at Umtali that they became infected with the disease, the whole herd in the end being carried off by the malady.

From here the infection spread to Salisbury and along the main roads to Bulawayo and other parts of Rhodesia before the true nature of the disease was known.

The Transvaal was invaded in 1902 at Komatiapoort and Nelspruit, and from there the disease spread to Swaziland down into Zululand and all over Natal, until at the present time there is only one district in the latter Colony where the disease has not yet appeared.

NATURE OF THE DISEASE.

When the disease broke out amongst the imported Australian cattle in Rhodesia, many died presenting marked symptoms (both visible and *post-mortem*) of Redwater, but as the disease progressed and attacked the native cattle, the Redwater symptoms were not so frequently observed. Still, up to the time when Professor Koch came to investigate the disease at Bulawayo in 1903, it was considered to be and was described as Texas Fever or Redwater, the causal organism found in the blood being taken as a form of *Piroplasma bigeminum*.

As a result of experiments and observations, Professor Koch first showed that East Coast Fever is a distinct disease of bovines, and differs in many respects from Texas Fever:—

(1) Shape of the organism: That of East Coast Fever is a rounded drumstick-shaped organism or spherical in form and is smaller than the pear-shaped *Piroplasma bigeminum* of Redwater, and is only found in the red blood corpuscles of animals actually affected or which died of East Coast Fever. It is not found in the blood of recovered animals like Redwater.

(2) East Coast Fever cannot be transmitted by inoculation with the blood taken from sick or recovered animals, as is the case with Redwater.

(3) Animals affected with East Coast Fever shew no diminution of the number of red blood cells, no marked anæmia and no red urine.

(4) Animals recovered from East Coast Fever are still susceptible to Redwater and *vice versa*.

(5) There is no enlargement of the spleen as seen in Redwater.

(6) Koch's granules or bodies: These are peculiar bodies, which are invariably seen only in animals affected with East Coast Fever, when smears are taken from the spleen and lymph glands. In size these bodies may vary from that of a red blood corpuscle to three or four times that size. They have also been seen in the heart blood, free or enclosed within the leucocytes. When stained with Eosin and Methylene Blue they appear as rounded or oval blue-stained masses, containing many red-stained points. They are of considerable importance in diagnosing East Coast Fever from *Piroplasma mutans*, a disease affecting cattle and recognised by farmers as "Gall-sickness," due to a bacillary form of piroplasm like that of East Coast Fever.

SYMPTOMS.

The visible symptoms are not very characteristic, and are sometimes very similar to those seen in so-called "Gall-sickness" or "Bush-sickness," and it is often only during the last three or four days of the sickness that marked symptoms are observed. The affected animals frequently keep on feeding up to shortly before death.

The first evidence of the disease is high temperature (106° F. to 107° F.), followed by general depression, dropping of the ears and head, with dribbling of saliva from the mouth and running from the eyes. There is constipation at first, followed by slight diarrhoea of a slimy nature and often tinged with blood. The urine is normal in colour, unless complicated with Redwater, when the urine may be red. If the lungs are affected symptoms somewhat resembling Lung-sickness are shown, these being distressed breathing and a short cough.

There are sometimes swellings behind the ears and in the throat, due to a congested condition of the glands. Just before death the affected animal may show signs of delirium or may die in a comatose condition.

The average incubation period lasts about 10 days and the duration of the disease about 13 days. The average time from infection to death is about 25 days.

POST-MORTEM LESIONS.

These vary considerably, but some are quite diagnostic if the affected animal is allowed to die. If killed, however, in the early stage of the disease probably nothing marked will be observed, except a little enlargement of the liver. The flesh is generally of a yellow brown-red colour and the fat has a brownish-yellow tinge. The lungs are often oedematous, and on cutting into the substance froth and a straw-coloured fluid exude, this exudate often being so great that frothy foam is seen protruding from the nostrils after death, very much like that seen amongst horses dying from horse-sickness. Haemorrhagic infarcts of various sizes are also to be found in the lungs. There may be a yellow-coloured liquid in the chest cavity and also in the heart sac, and small red spots on the surface of the heart. The liver is usually enlarged, rather yellowish, much congested and friable, due to fatty degeneration, the bile being thick, yellow or green and viscid. The spleen is normal in size unless the disease is complicated with Redwater, when it may become enlarged. The kidneys are softened and the structure congested. Both in the lungs, liver and kidneys red or yellowish-white patches of local necrosed tissue called infarcts are to be seen, these being caused by the blocking of the fine capillary blood vessels by organisms; they are of a red or yellowish-white colour with an inflamed area, and are to be found raised on the surface or in the substance of the organs. These infarcts are considered to be one of the most characteristic *post-mortem* lesions, but they need not necessarily be present in East Coast Fever.

In opening the abdominal cavity a little fluid often escapes, and a yellowish discolouration with blood spots is found on the lining membrane covering the intestines (peritoneum).

The fourth stomach is the seat of inflammation, showing congestion, reddening and thickening of the mucous membranes; ulcers may be present at its exit into the small gut (pyloric orifice).

The intestines, both large and small, are frequently congested with patches of hæmorrhage (blood markings) throughout, particularly the small intestines.

The lymphatic glands are swollen and congested.

The mortality is about 90 per cent. of the affected animals.

Owing to the uncertainty of the symptoms (both visible and *post-mortem*), it is often necessary to examine the blood (under the microscope) of all animals suspected to have died of East Coast Fever in order to confirm diagnosis or suspicion.

Just before death the parasites are found to be very numerous; often 75 per cent. to 90 per cent. of the red blood cells are found to be invaded.

NATURAL METHOD OF PROPAGATION.

Under natural conditions East Coast Fever is transmitted solely by ticks. Five species of ticks, all belonging to one genus, have been found to convey the disease, viz.:—

- Rhipicephalus appendiculatus* ("Brown Tick").
- „ *sinus* ("Black-pitted Tick").
- „ *capensis* ("Cape Brown Tick").
- „ *nitens* ("Shiny Brown Tick").
- „ *evertsi* ("Red Tick").

One or more of these varieties are to be found in most parts of the Cape Colony, and it is therefore possible for the disease to become established wherever these tick are present, even in the High Veld.

For the purpose of eradication of ticks and the diseases they propagate, it is necessary to have a knowledge of the habits and life cycles of the different species of ticks which infest our domesticated animals. Thanks mainly to the investigations of Mr. Lounsbury, the Government Entomologist, the life cycles of the different species are now known.

It is a common error amongst stock owners and others to believe that ticks breed in the ground and get on and off animals promiscuously in order to feed. This is incorrect. All species of ticks have their natural hosts, upon which they must pass certain periods of the different stages of their life cycles in order to develop. The following are the stages of the life cycles of ticks:—(1) Egg; (2) larva or seed tick; (3) nymph; (4) adult or sexual tick.

Starting with a fully engorged female tick which has been impregnated by the male on the host and is ready to fall to the ground to lay her eggs, the following is a description of the habits of East Coast Fever ticks during their life cycles:—The engorged female finds some suitable place to lay her eggs, either in grass or soft soil, and after laying her eggs she shrivels up and dies. The eggs, after a lapse of certain periods, which run from weeks to months according to the species of tick, begin to hatch out, and the young larvae appear. These larvae crawl up the stalks of grass or on to the branches of bushes and patiently wait until an animal comes along to which they can attach themselves. One species of tick, the "Blue Tick" (*Rhipicephalus decoloratus*), passes its complete life cycle on one host, but the different species of tick that transmit East Coast Fever must have two or more hosts during the life cycle to be able to propagate the disease. The "Red Tick" requires only two hosts, as during the first two stages of its life cycle it remains on the same host.

All the Brown Ticks, in which group we will include the Black-pitted, the Cape and Shiny Brown Ticks, together with the Brown Tick *Rhipicephalus appendiculatus*, require three hosts. The larvae of these species, which like all larvae have six legs, having found a host, begin to suck blood, and after repletion, which takes from three to ten days, drop off. After a period of from a fortnight to two months, during which time the larvae have changed their skins and developed eight legs, another host is found, and after taking from three to five days to replete, they drop again to the ground, when a second moult occurs. The tick now becomes an adult, the period taken over this process averaging about 18 days. The adult then finds her host, and in a few days, about a week, becomes fully engorged after meeting the male on the animal and becoming fertilised.

The disease can only be transmitted naturally either in the nymphal stage after feeding as larvae on sick cattle, or as adults after sucking blood from sick animals in the nymphal stage.

Once an infected tick has bitten an animal it apparently cleans itself of its poison, since it afterwards fails to infect other animals. For instance, if after biting a susceptible healthy ox, which becomes infected, the tick drops off and gets on to another healthy susceptible ox in its next stage of development, it fails to infect the second, because it is not long enough on the previous host to become re-infected. Should the infected tick first bite a horse or any other animal except bovines, the poison is discharged without affecting the animal bitten and the tick becomes non-infective so far as bovines are concerned.

Unlike Redwater, the poison does not pass through the egg from an infected tick. The majority of cases of infection on the veld are probably caused by adult Brown Ticks (*Rhipicephalus appendiculatus*), which as nymphs had fed on cattle in the last stage of East Coast Fever. No animals other than bovines can carry the infection, and recovered cattle are incapable of conveying infection to the ticks.

IMMUNITY.

There is no doubt that animals which have recovered from East Coast Fever are immune, and the immunity is permanent, but the percentage of recoveries is very small. Unlike other cattle diseases which have devastated this country, such as Rinderpest, in which the disease rapidly spread through the land, killing a large percentage, and afterwards quickly disappearing, leaving no permanent infection behind, and unlike Red-water, from which disease the young calves have a natural protection and acquire so strong a tolerance that the natural increase is not materially checked, it was found in Rhodesia that the progeny of salted East Coast Fever cattle had no immunity to speak of, as they too contracted the disease and died.

It is stated that in German East Africa calves born there on infected veld do resist infection, but from the scarcity of cattle in those districts it would seem that only a percentage survive, and that a natural immunity amongst a race of cattle would probably take a century to acquire.

It is a moot point how cattle in East Coast Fever areas acquire their immunity, whether they are born absolutely immune or obtain the immunity by direct infection and subsequent immunity: but it is probably the latter.

It is, therefore, evident that if East Coast Fever is allowed to become established in a country, that country will probably never, or, at any rate, for many, many years, again become what is known as a cattle farming area.

ERADICATION AND PREVENTION.

It is the unanimous opinion of veterinary experts who have had much experience in dealing with East Coast Fever that the most effectual, cheapest and quickest method known for eradicating the disease is the adoption of the stamping out policy. Having ascertained by experiment that fenced infected East Coast Fever areas from which susceptible cattle have been removed become clean in 18 months, the stamping out policy can be successfully carried out by the slaughter of all cattle running on infected veld; by the fencing of all infected and suspected areas; and by keeping all cattle out of such areas for a period of not less than 15 months.

In order for this to be successfully carried out, all movement of cattle in infected and suspected areas must be rigidly controlled, and in addition we must also have the sympathy and co-operation of the farming community and a mutual understanding between the farmers and the officials concerned.

Unfortunately, in South Africa there is a large section of the farming community, white as well as black, who will bitterly oppose the slaughtering of healthy cattle for the purpose of stamping out cattle diseases, and should East Coast Fever break out in our Colony, it will probably do so first either in Pondoland or in the native districts in East Griqualand. It is very doubtful whether the stamping out policy could be carried out successfully in native districts, and probably some modification of the policy outlined above would have to be adopted.

By fencing and by absolute control of the movement of cattle in infected and suspected areas, the spread of the disease can be effectually stopped.

In Natal temperature camps were employed with the view of moving healthy stock out of an infected area and leaving the infected cattle and infected ticks behind. Many outbreaks were dealt with by this method with a minimum loss. In order to carry this out successfully a fenced farm with plenty of spare veld is required, and the following precautions are necessary:—A portion of the farm should be fenced off, and under no

conditions should cattle be grazed there, this being looked upon as clean veld. It would be better for this ground to be divided into two camps. Should East Coast Fever break out, all the cattle, except those visibly sick (which should be immediately destroyed), are brought to this clean veld, where they are to be detained for from 21 to 24 days. Temperatures of all the cattle in this clean camp are taken carefully daily, and any showing high temperatures (103·4° F. and over) should be considered infected and turned out of the camp. After the expiration of 24 days the remaining healthy cattle can be turned in to the other clean camp.

By experiments it has been proved that ticks that attach themselves to affected East Coast Fever cattle only become infected during the latter stage of the disease. For the first two days of high temperature the parasites are not visible in the blood, and the ticks only become infective after the parasites are visible.

It is apparent to those knowing our native districts that this method cannot be adopted, owing to the lack of fences and the large number of cattle grazing in native locations in proportion to the acreage of pasturage available. We will, therefore, have to depend mainly upon our fences and the methods that are adopted to prevent illicit movement of cattle. Fences alone will not prevent natives from moving cattle in and out of prohibited areas unless the area is effectually guarded by means of police. The expenses of such guarding would be enormous.

The only alternative is the *branding of all cattle in infected and suspected areas*; this branding should, if possible, be done before the disease gets into a district. There are certain objections to branding native cattle held by officials in native districts, but this Department has recently made a good start in the direction of branding, when transport oxen travelling on the roads between the Native Territories and the Colony proper were compelled to be branded. It need not be necessary nor advisable to brand each individual owner's cattle with a distinctive brand; it would only be necessary to place a distinctive brand on cattle in each location of a district.

CATTLE DIPPING.

If dipping is carried out systematically, especially if combined with fencing, it will be found to greatly lessen the risk of infection, by reducing the ticks capable of carrying the disease, but as only one or two ticks are necessary to convey East Coast Fever it will be apparent that this systematic dipping must be carried out for a considerable time (several years) to bring about such a result. If a herd is already infected and exposed to tick infection, dipping, even if carried out weekly, will not greatly reduce the mortality. Experiments in the Transvaal proved that cattle dipped just prior to exposure to infection and also during such exposure, contracted the disease as readily as cattle which were not dipped.

Dipping and spraying, therefore, under such conditions can only be regarded as a means of diminishing veld infection and not as a step likely to reduce mortality.

In unfenced districts, like our native districts, it would not be advisable, should East Coast Fever become established there, to continue dipping under conditions which necessitated the use of central dipping tanks, because no dip can be depended upon to keep off ticks for any length of time, and animals may become infected at the dipping tank before being dipped, by picking up ticks which have dropped off sick cattle belonging to other herds, or even while returning to their grazing ground after being dipped. These congregations of cattle would lead to the rapid spread of the disease throughout the district. But there is no reason against nor objection to systematic dipping or spraying being generally

carried out in our tick-infected areas whilst they are still free from the disease, in order to lessen the risk of infection.

A large number of experiments were conducted in this Colony by Mr. Lounsbury in conjunction with the Veterinary Department, and it was found that arsenical solutions are the only ones which have been found effective as tick destructors when used in a bath. As a spray, paraffin, as well as arsenic, was found effective.

The best results were obtained by dipping cattle in a simple solution of arsenite of soda in proportions varying from 1 lb. arsenite to 25 gallons of water to 1 lb. arsenite to 20 gallons water.

With care and the use of certain precautions cattle can be dipped in such solutions every fortnight with no ill effects. If it is desired to dip weekly then a much weaker solution must be used, viz.: 1 lb. arsenite of soda to every 50 gallons water. Sometimes other ingredients are added to the arsenite, such as Stockholm tar, paraffin and soft soap, but it is doubtful whether such additions are of any practical value.

Strong arsenite solutions, such as 1 lb. to 20 gallons of water, are not sufficient to kill all the ticks on an animal, and do not prevent ticks from attacking cattle, and no compound is known which will kill all ticks on an animal without injuring the skin. Still, arsenite of soda is being widely used in the tick-infested districts of the Eastern portion of this Colony as a cattle dip with excellent results.

It is not advisable to dip cattle when in a heated condition, and after being dipped they should be allowed to return quietly to their grazing ground.

Atmospheric conditions have a marked effect upon the results of cattle dipping. It is better to dip early in the morning or late in the afternoon to prevent the cattle from drying too quickly, thereby allowing the poison in solution to have a longer action upon the ticks.

Cattle should not be dipped when misty rains are prevailing, for under such conditions there is a tendency for cattle to scald. Neither should cattle be dipped during thunderstorms or heavy rains, as these will have the effect of washing off the poison from the skin.

GRASS-BURNING.

Grass-burning alone will not eradicate ticks; it will assist in the destruction of ticks, by killing those which are attached to the stalks of grass, but most of the eggs will escape destruction. This grass-burning to have the best results should be done during the summer months, when the ticks are being hatched out and the moulting process is going on. Grass-burning alone will not eradicate ticks; it only helps with cattle dipping to more quickly reduce their number.

STARVING PROCESS.

If all animals are kept out of a camp for a certain length of time the ticks therein must eventually die from want of natural hosts upon which to feed. In America they have adopted this method of getting rid of the Blue Texas Fever Tick, and speak about cleaning paddocks in 125 to 150 days. For the purpose of finding out how long a camp takes to become free of ticks in this country, one experiment was undertaken by this Department in 1904.

A large camp was shut up on March 14th, 1904. A wild calf was found in it later, but was shot on April 14. On July 24th, 1905, ten clean cattle were put in; seven days later they were rounded up, and 65 Bont, 70 Bont Leg and 86 Red Ticks, all adults, were found on them.

On August 2nd twenty more cattle were put in, and three days later an average of about 25 adult ticks to a beast were found. No larvæ ticks were found. The lease of this land was allowed to expire September 1st, and the experiment was not continued.

Another experiment on these lines is at the present time being conducted at Gonubie Park farm, East London, belonging to Messrs. Cooper and Nephews.

At the end of 18 months 3 clean cattle were put into the test camp for 3 days. At the expiration of this time they were taken out and examined, and were found to have quite a number of ticks on them. This experiment is to be continued.

Some ticks have been known to survive confinement 18 months. Mr. Lounsbury states that he has at the present time two bottles of adult *Rhipicephalus evertsi* (Red Tick) that have been standing as they are since July, 1908. Many of the specimens are still alive.

It is evident from this that starvation of ticks is a slow and long process in this country, and there are not many farmers that can afford to spare their veld for the long time which seems to be necessary to get rid of ticks by this process.

TREATMENT AND PREVENTIVE INOCULATIONS.

All drugs which were thought to be likely to have any good effect by destroying the parasite in the blood have been tried, but so far have failed. Recently the writer tried intravenous injections of saturated solutions of Typan blue on 15 cattle in an infected East Coast Fever area in Natal, with the result that 12 died of the disease, 2 recovered, and one up to the present time has not become affected.

Professor Koch recommended inoculations every fortnight with 5 cubic centimetres of defibrinated blood taken from an animal which had recovered from the disease for a period of from four to five months.

This method totally failed, so also did the serum method adopted by him.

With the view of artificially transmitting the disease inoculation experiments with the blood and juices from the tissues of an infected animal, a mixture of macerated infected ticks with sterilised water, and a maceration of healthy ticks mixed with infected blood and injected into susceptible cattle failed to produce the disease. Recently a method has been found and described by Dr. K. F. Meyer, Pathologist, Government Veterinary Bacteriological Laboratory, Pretoria, which shows the possibility of transmitting East Coast Fever artificially by inoculation of large intact portions of a spleen from an infected East Coast Fever beast into the abdominal cavity.

Notwithstanding the failures that have followed both the curative and preventive treatments which have hitherto been tried, it is probable that some successful method of treatment for East Coast Fever will be found in the near future. Meantime the methods which have proved most successful in preventing the spread of this disease must be pursued. The resolution unanimously passed at the Veterinary Conference held at Cape Town in 1903 still holds good, namely: "That this Conference is of opinion that the only effective method of eradicating East Coast Fever is to kill off all cattle in infected areas, and to leave such areas free of cattle for a period of not less than 18 months."

EXPERIMENTS WITH OSTRICHES—XIII.

THE INFLUENCE OF NUTRITION, SEASON AND QUILLING ON THE FEATHER CROP.

By Prof. J. E. DUERDEN, M.Sc., Ph.D., A.R.C.S., Rhodes' University
College, Grahamstown.

With the extended experience of ostrich farming in South Africa, conducted under the most varied conditions, more and more facts are being accumulated as to the management of the bird, the whole purpose of which is the production of the finest feather crop possible. There are, however, yet many points upon which further experiment and investigation are needed to explain the varied results obtained; and perhaps no subject is more puzzling than that of the conditions under which a full and perfect crop of feathers can be assured. Too frequently an ostrich which has given a complete clipping of superior plumes will, on the next occasion, produce a nearly worthless crop, the feathers irregular in size and defective, and accompanied by many "blanks." The object of the present article is to draw attention to some of the conditions under which such incomplete crops are produced, in the hope that discussion thereon may bring forth the experience of others, and thereby lead to some solution of the difficulty.

THE INFLUENCE OF NUTRITION.

It is now accepted that to ensure a full and complete clipping of feathers, the bird must be in a high nutritive condition when quilled. The necessity for this in the starting of the crop has been impressed upon every ostrich farmer from his own experience, and has much to do with the increasing production of lucerne, rape, and other crops as food for the birds. No one now thinks of quilling birds during a drought or at such times as a plentiful food supply is lacking. The power of the bird to produce a complete and perfect clipping is found to be a more delicate matter than would have been expected from such a strong and vigorous animal as an ostrich, and among the influences concerned, nutrition must undoubtedly be placed first. Feathers are formed from the epidermal or outer layer of cells of the body, and these are highly responsive to a varying nutrition.

AN IMPROVING NUTRITIVE CONDITION DESIRABLE.

It is somewhat difficult under farming conditions in South Africa to keep an ostrich under equally good nutritive conditions all the year round, and this is not altogether necessary. The most critical period for the feather crop is during the early months of the growth of the feathers. A

crop well started can usually be depended upon to complete itself successfully, even if the bird is not kept all the time at the highest pitch of nutrition, while a somewhat lowered condition towards the close hastens the ripening of the quills by the more rapid withdrawal of the blood. Experience has proved, and physiology lends support to the notion, that a new crop of feathers is more likely to make a successful start if at the time the bird is improving or on the upgrade, as it were, as regards its nutritive condition. During the ripening of the quills some farmers prefer to allow their birds to get into a lower state than usual, and then one or two weeks before the time of quilling begin to build them up by high feeding and special treatment. Under such improving conditions we should expect that the increasing physiological vigour would be most favourable for renewing the activity of the feather germs previously allowed to become dormant.

UNDER-RIPENESS AND OVER-RIPENESS OF THE QUILLS—THE PRODUCTION OF BLANKS.

The degree to which the quills are allowed to ripen before being drawn is a matter of importance in starting a feather crop, and different practices are followed, partly dependent upon climate and partly upon the intention of the farmer as regards his birds, that is, as to how much he intends to force the growth. It is well established that a quill or feather drawn before ripeness, that is, while still growing and richly supplied with blood, is sure to be immediately followed by a new feather. This is best seen in the case of plumes which are trampled out while only partly grown. New feathers invariably appear from these sockets, and in the management of their birds some farmers take advantage of this fact and pull the quills while yet far from ripeness. The advantages are twofold: (*a*) time is saved, so that another clipping can be secured earlier, and (*b*) a full complete crop of plumes is assured, without any blanks.

Unfortunately, Nemesis, in the form of a shorter and smaller feather, follows upon this unnatural procedure, and if the practice is persisted in the feather-producing powers of the bird are greatly impaired, if not altogether ruined. Most farmers, therefore, hold it to be desirable to allow the quills to ripen to such a degree that practically all the blood is withdrawn from the medulla and the tip of the quill is becoming hard and dry. In this case the succeeding crop may be expected to be as good as the previous ones.

Where ripened quills are allowed to remain in the sockets for four or five months, the blood has largely withdrawn from the feather-germ, and naturally it takes somewhat longer to re-establish the full circulation in a dormant germ than where, as in a green quill, it has never been reduced. It is very desirable that all the feather-germs on a bird should start evenly, for feathers appearing in advance of the general crop are nearly always imperfect, while those later are usually perfect.

The production of blanks can be readily understood from a knowledge of the physiology of feather-growth. When a quill is drawn green, the feather-germ at the bottom of the socket is still in an active growing condition, and the removal of the quill at once gives the necessary stimulus to the germ, and it sets about the production of a new feather to take the place of the one lost. On the other hand, the feather-germ below a quill which has been ripe for some time is dormant, the blood is largely withdrawn from it, and though ordinarily the removal of the quill stimulates it to renewed activity, this may not occur if the bird is in a feebly nourished state, or if the seasonal conditions are unfavourable. A "blank" represents a feather socket of which the feather-germ has either been destroyed

or is dormant. In most cases the germ is only dormant, and its activity is restored on the return of favourable conditions. When a bird is quilled at an unfavourable time, the few new feathers which appear are probably from sockets in which the feather-germ had not become quite dormant, while where blanks occur the feather-germ was dormant and has not awakened to activity. Hence, speaking generally, there is a greater risk in the production of blanks from over-ripe quills than from quills under-ripe, and one must make certain that all the other conditions are favourable for beginning a new crop before drawing over-ripe quills.

EXTERNAL INDICATIONS AS TO THE CONDITION OF A BIRD FAVOURABLE FOR QUILLING.

It would be a great boon to ostrich farmers if more were known with certainty of the outward appearances which indicate whether a bird is in a favourable condition or otherwise for starting a new crop of feathers. Most farmers are content to say that their birds are fat, and in apparently excellent condition, and yet results show there is something amiss, as a full crop does not appear. In Number V. of this series of articles, published in the March issue of the "Agricultural Journal" (1908), attention is directed to the scalliness of the skin as a helpful indication of the state of the bird, and experiences since that time but serve to confirm the opinions there expressed. It is fully established that in a general way a bird will start its best crop of feathers only at such times as the skin is clean and free from scurf, and therefore the condition of the surface may be taken as one of the most reliable indications we have as to the health of the bird. Before quilling, a farmer will do well to examine the naked part of the body under the wing; if this is smooth, clean, firm and healthy-looking, he may be assured that his feather birds are in excellent condition, while if it is powdery and scaly, dry and flabby to the touch, they should be placed under better feeding conditions before quilling, or possibly an imperfect crop will result, and the birds may fail to preen properly such feathers as do appear.

SEASON AND SEXUAL CONDITION OF THE BIRD.

Many instances occur where even though a bird is apparently in excellent condition, and the food supply is lavish, yet the crop is a failure. It would appear that many of these cases can be put down to the season of the year, and it is well established, at any rate in the Eastern Province of Cape Colony, that the winter period, say, from the middle of May to the middle of August, is an unfavourable time for the beginning of a new crop of feathers. Many conspicuous examples of this fact have occurred during the winter just past, when a drought of over four months was experienced. Several birds quilled during May or June were temporarily ruined: the full crop of feathers failed to appear, and even those which did shoot out were irregular and defective. The food supply may have been to blame in some instances, but the season and climatic conditions were undoubtedly unfavourable. In one very marked case a high grade cock, feeding upon an abundance of lucerne, sent out but a few inferior feathers after being quilled at the end of May. Among a troop of feather-birds, however, not all would suffer in the same way: perhaps half would give an imperfect crop, while the others would shoot out feathers from all the sockets; so that a certain amount of individuality is involved.

In a previous article it has been shown that the sexual stage of the bird also has much influence upon its feather-producing capacity. Speaking generally, the best feathers are grown during the non-breeding season of

the year, and the best time for quilling is the same as that for natural moulting, namely, such a time as will bring the feather to ripeness at about the beginning of the mating season. The actual dates for this will vary somewhat in different districts, but in the Eastern Province the best times for quilling are from October to February.

RECOVERY OF BLANKS AND EVENNESS OF CROP.

The presence of an uneven crop of feathers is a source of loss and trouble to an ostrich-farmer, and perhaps no better test of his ability to manage a troop of birds can be shown than by having his clippings even and complete, his birds free from blanks, and feathers growing out-of-time. This, however, is by no means an easy matter for, independently of the causes conducive to blanks and irregularities alluded to above, there is always the possibility of the trampling out of partly grown feathers to be considered. Under ordinary circumstances, blanks resulting from quilling out of season, or while the bird is out of condition, recover with the advent of more favourable times, if not all at once, at least following shortly upon one another. In these cases it is usual to clip the various plumes as they mature, and delay the quilling until all the quills are ripe, when the next crop will start even. This necessarily involves a loss of time, but no other method has yet been found practicable.

When, however, only a few feathers are out-of-time, it is not always worth while to wait until they ripen before evening-up the crop. And in such a case many farmers do not hesitate to pluck the partly-grown feathers at the same time as the ripe quills are drawn. As already shown, a new feather is sure to appear from these sockets, but it is not likely to be as large as those growing from the sockets of which the quills were ripe, and thus in the new crop there may be plumes of varying sizes growing side by side. In an earlier article (No. VIII.) the question was raised whether such inferior feather-producing sockets ever regain their original power. An experiment was then in progress to test the question, and has since been completed, as a result of which it can be asserted that *inferior feather-producing sockets do recover their former power, and in the succeeding crop give just as large and perfect feathers as originally.*

This result is very satisfactory from a farmer's point of view, and proves that in evening-up his crops he may confidently expect that with proper care and judicious treatment all the feather germs will recover any temporary irregularity, and each socket will produce a normal feather. It may be left to a farmer's own discretion whether or not he will pluck green feathers growing out-of-time, but he has now the satisfaction of knowing that the feather germs will subsequently recover, even though the first feather after the operation be inferior.

FOR HOW LONG WILL AN OSTRICH CONTINUE TO PRODUCE A GOOD CROP OF FEATHERS?—THE AGE OF OSTRICHES.

The question as to how long an ostrich will live and continue to produce a good crop of feathers has naturally a special interest to ostrich farmers in South Africa. The industry, however, has not been going long enough to enable us to answer the question with any degree of completeness. The ostrich was first domesticated on a farming basis only about forty-five years ago, and not much progress was made for some time. It is now impossible to trace individually any of the original wild birds with which pioneers like Hon. A. Douglass commenced, but the history of some birds can be followed for nearly forty years.

One of the best known of the older birds, whose history is well authenticated, is the famous cock "Old Jack," owned by Mr. Hilton Barber, of Halesowen. The bird is now thirty-five years old, and the following details have been kindly supplied by Mr. Gray A. Barber. He was hatched as a chick from wild birds obtained from the Kuruman district, and has himself been breeding at Halesowen for thirty years, and still has two or three nests each season. As shown by the accompanying photograph his feathers are still good, very little depreciation having taken place all through the years. The custom has been to pluck him every ten or eleven months, though this has varied a little according to his nesting periods, his feathers being left untouched while sitting. It is encouraging to learn that the old bird is still very vigorous and active, and is at present sitting on a nest of eighteen eggs.

Another celebrated bird, at least thirty-five years old, is owned by Mr. H. E. Moss, of Mosslands, near Grahamstown. The actual age of this bird seems a little uncertain, some asserting that they can trace his history for forty years, though there is no doubt whatever that he is at least thirty-five years old. Here again the bird is still capable of producing a fine crop of feathers, a plume being represented in the photograph. His last clipping of wing quills sold at the Grahamstown sales for £12 10s. per lb., and he has a nest each year.

From these two instances it is manifest that the ostrich is a very long-lived bird. If well cared for a bird at thirty-five shows little evidence of diminution in his reproductive or other powers, and is capable of producing nearly as good a crop of feathers as at any earlier period. How much longer he will retain these powers can only be surmised, but it is obvious that careful records should be preserved of the fate of birds with long and well authenticated histories. The physiological activities of the ostrich are largely reflex, not cerebral, in character and, barring accidents and disease, we have no reason to expect that his vitality may not be continued greatly beyond that of the oldest bird with which we are acquainted.

The length of time which a bird will continue to produce a good crop of feathers is unquestionably dependent upon the management of the bird, especially as concerns the frequency of clipping. We may assume that in a state of nature an ostrich, like most other birds, produces a new crop of feathers each year, and if under domestication we increase this, as is done under the eight or nine months system of quilling, we may reasonably ask whether the same quality of feathers will continue to be produced. Both Mr. Barber and Mr. Moss follow a nine or ten months system of quilling, and their clippings show little or no deterioration with age. Against this there is abundant evidence to prove that when birds are continually forced to produce a crop every eight months or less, deterioration sets in, the feathers becoming smaller and stalky. Something undoubtedly depends upon the feeding and individuality of the bird, but still the above may be taken as a general experience. The farmer will have to decide for himself whether he desires to get from his birds all they can produce in as short a time as possible, or whether he is content to allow them to do the best they can over a long period without deterioration.

It may still be asked whether birds which have undergone deterioration as a result of too frequent clippings will ever recover. Ostrich farmers generally assume that such is not the case: but this idea may possibly be founded upon imperfect evidence. We now know from experimental evidence that odd feather germs recover their original power after producing an inferior feather, and it is yet to be proved how far this will apply to the crop as a whole, and how many times the quills may with

safety be drawn while green. Certain it is that the gain from too frequent clippings is so comparatively small, and is attended with so many risks, that the careful farmer will be well advised not to adopt the method.

SUMMARY.

The chief influences which have been shown to determine the quality and completeness of the feather crop of any particular bird may now be summarised.

1. The first and most important is that of the nutritive condition of the bird at or shortly before the beginning of the crop. Only when a bird is in a high nutritive condition at quilling can we be assured of a complete even crop, the best the bird can produce.

2. An improving or upgrade nutritive condition is more likely to awaken dormant germs to activity than if the bird is kept in a uniform state.

3. Blanks are less likely to occur in sockets from which the quills when drawn are under-ripe than when drawn over-ripe, but the drawing of immature quills is found to deteriorate the succeeding crop.

4. The appearance of the skin, whether scaly or clean, is of assistance in determining whether a bird is in a suitable condition or otherwise for starting a crop of feathers.

5. The completeness and quality of the crop is partly dependent upon the season of the year, and the sexual condition of the bird. Other things being equal, the best crops are produced during the non-breeding season of the year.

6. Sockets giving blanks by quilling at unfavourable times are likely to recover under better conditions, though less likely in the case of young than of mature birds.

7. Sockets giving inferior feathers as a result of plucking the plumes while green recover their original power in the succeeding crop.

8. Under proper care and management (not quilling too frequently) an ostrich will continue to give a feather crop without much deterioration for thirty-five years, and will continue to breed for that period, and probably much longer.

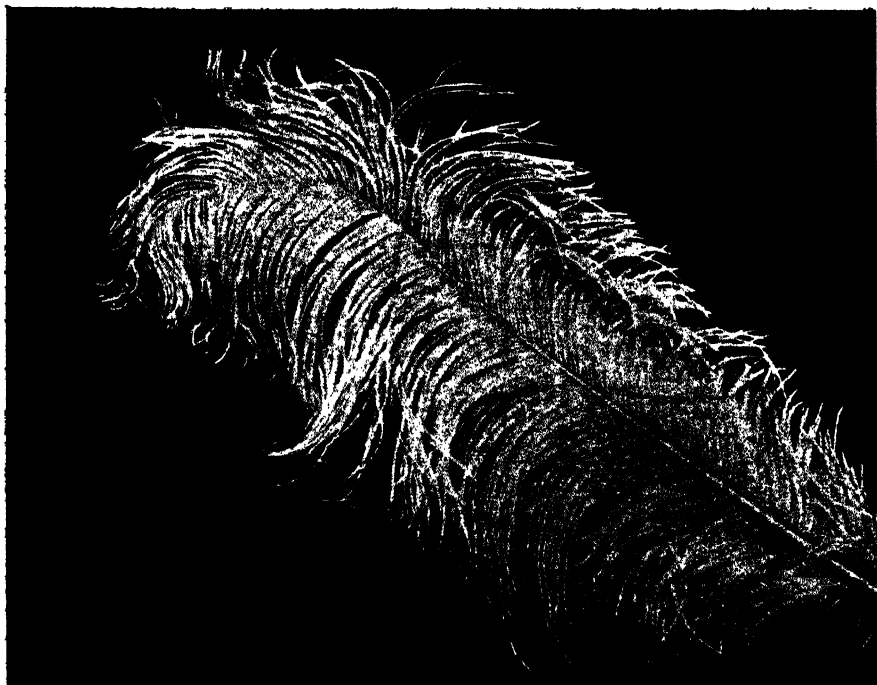


Fig. 1.—Plume grown by Mr. Hilton Barber, Halesowen, from "Old Jack," at the age of 35 years old.

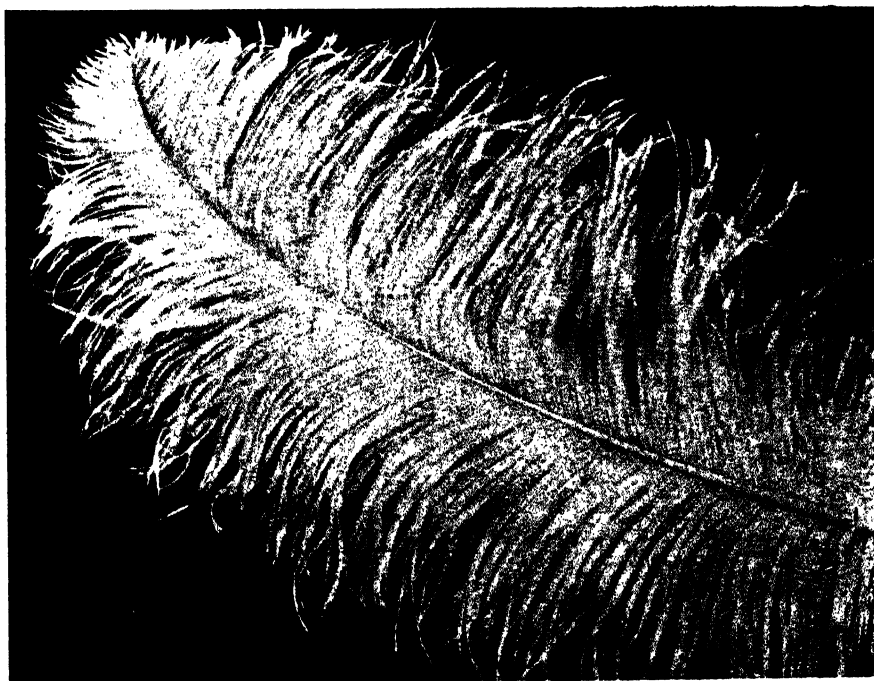


Fig. 2.—Plume grown by Mr. Harry Moss, Grahamstown, from a cock at least 35 years old.

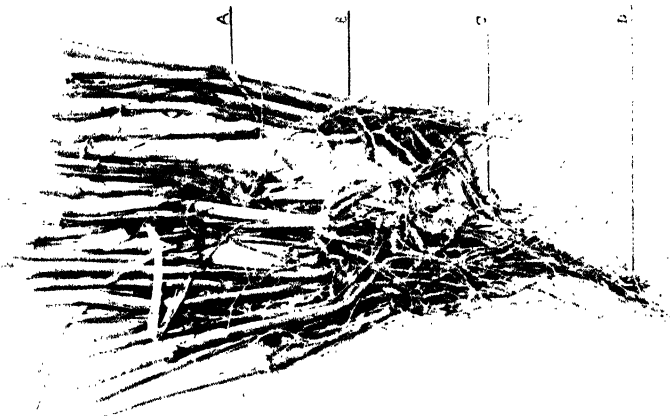


PLATE 8.—(Reduced.)

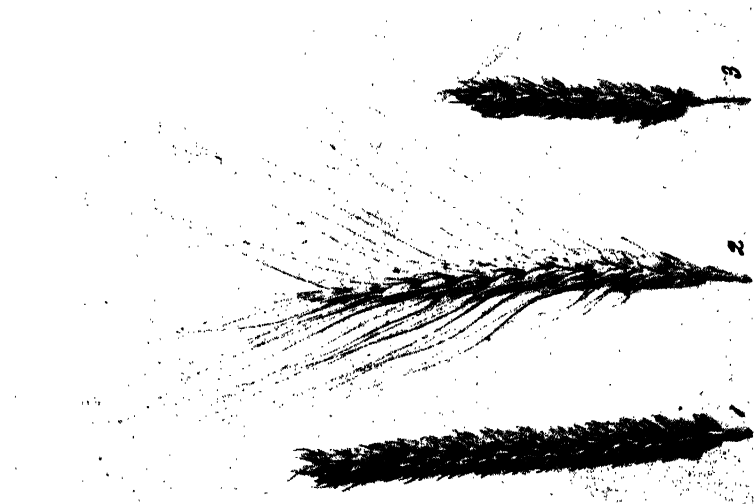


PLATE 7.—(Reduced.)

EARTHING UP OF WHEAT TO INCREASE YIELD.

In parts of China where land is scarce and labour cheap the earthing up of wheat is practised to a considerable extent. The seed is planted in hollows, and from time to time during the growing season is earthed up. This earthing up causes new roots to grow from each knot to which the earthing up is carried, and a number of new shoots are thrown off. Thus a plant which in the ordinary way might have yielded three to five ears can in this way be forced to grow five to ten times as many. An experiment of this nature was carried out last season by Mr. T. A. Sladdin, Union-Castle Buildings, Cape Town. The wheat was planted in white sandy soil on June the 15th. In July the seedlings were earthed up to a sufficient height to cover the first joint above the root, and were watered for the first and only time. On the 1st August the seedlings were earthed up a second time, and on the 22nd August earthed up for the third and last time. As a check some plants were only earthed up twice, and some not at all. None of the plants received any manure, and were grown on the poor soil of the Cape Flats. The plants not earthed up yielded an average of three heads; those earthed up twice, five heads; and the three earthings up gave a yield of twenty-six heads. Not alone were the number of heads increased, but the heads from the earthed up plants were far finer. As will be seen from Plate 7, ears 1 and 2 are from earthed up plants, and No. 3 from the plant not earthed up. 1 and 2 are quite double the size of No. 3. Thus the number of ears is not only doubled, but the size of the ear as well. Plate 8 shews the various growths. D is the original growth, C shews the roots and shoots thrown out after earthing up to the first knot, B shows a great quantity of roots and stems from the second earthing up, and A, the third earthing up, shews a weaker number of roots, but the straws which gave the roots are far more robust than those which did not.

It is intended this year to try a fairly extensive experiment on these lines, working with a view to a practical result. It has been found with the dry land experiments that the wheat sown in drills 12 to 18 inches apart and cultivated did exceedingly well, and as cultivating is necessary, there is no reason why the wheat should not be earthed up at the same time, thus burying the original roots to a much greater depth, and so enabling the wheat to withstand the drought. This point will be severely tested during the coming season.

NOTES ON SOME DISEASES OF THE OSTRICH.

By W. ROBERTSON, M.R.C.V.S., Director Veterinary Laboratory,
Grahamstown.

Very little is known about the diseases of the ostrich, in fact, if we exclude the internal parasites, they are not even named, except by the farmers, who have affected birds, employing nomenclature suggested by the clinical symptoms. Thus we have "Dronkziekte," "Kalkziekte," "Kopziekte," and, of course, "Lamziekte," this latter term being employed when a bird is down and unable to rise from any cause whatever. The study of the diseases of the ostrich must be preceded by some study of the habits, nature, and constitution of the healthy bird, and, during this preliminary work one is astonished to find how very little the best ostrich breeders do know about their charge's habits and behaviour, and some of our most successful men will candidly admit that "when we farmed birds for five years we thought we knew all about them, after fifteen we are forced to the conclusion that we have lots to learn." It would appear that preconceived theories are having to be modified, and, daily, new facts are being added to our knowledge. As I go on I find that our knowledge of the bird's habits is not so scanty but is simply not distributed at all widely amongst the ostrich men. Since the work of the late Hon. Arthur Douglass, I do not ever remember seeing any literature dealing with ostriches' habits and ostrich farming, nor do I ever remember hearing any ostrich farmer speak at length on the subject in a connected address.

In working at the diseases of *The Bird*, an investigator with an ordinary College and Laboratory training is faced by a difficulty. He has no literature on the subject, no works of reference, and no jumping-off place as it were, and, in addition, he has to train himself. The ordinary Veterinary Surgeon knows the ostrich as a type of Genus *Aves*, sub class Neornithes, division Ratitæ or Runners; he may have seen the bird in a zoological collection, and its skeleton in an anatomical museum, but there his knowledge ceases. He has never dissected a specimen, and its internal economy is to him of little importance. The embryo veterinarian during his college career would as soon imagine that chance might call him to prescribe for a snake as an ostrich. I emphasise these points in order to demonstrate the need for care in our first investigation work, and certainty in our results, before we talk about them. Ostrich disease investigation is pioneer work in the strictest sense, and as such we must expect its path to be beset with many difficulties, endless failures, and few definite results. I am sometimes asked: "Have not you men found a remedy for such and such a disease? Why, you have been at it for a year." The number of diseases for which we can definitely ascribe a cause are few, and those for which there are proved remedies fewer still, the causes of small-pox and scarlet fever in man are still mysteries, and the brightest intellects of the age have been focussed on these problems. But through all the work,

even if definite results are not at once forthcoming, we have an increased knowledge of factors governing the causation and spread of disease, and this knowledge is often useful in elucidating other problems. As the poet has it: "Knowledge comes, but wisdom lingers," and daily we are gaining knowledge, and retaining wisdom, in many problems of preventive medicine, as against the sometimes empirical work of curative medicine.

In studying the diseases of the ostrich, much difficulty is experienced in separating disease due to bad management, improper surroundings, peculiarities of strain, change of food, etc., and the affection actually due to one cause. To explain what I mean I will give an analogy in cattle. A herd of stock starts purging and dying. Is this due to food or water, or to a special disease like Rinderpest?

The ostrich also is a wild animal, being rapidly brought under domestication. I do not suppose that such a swift transition has ever before been noted in practical stock work. Here we have a bird which has been accustomed to dry high areas, barren, stony land, and a diet of veld vegetation and seeds, suddenly crowded into small camps, low lying and closely planted with irrigated green crops, such as lucerne and rape, and in such paddocks birds are bred and reared year after year, the land never rested, limed, or disinfected in any way. I feel certain that old lucerne paddocks are to our birds what the dams are to our cattle, viz., the storehouses of internal parasites. It is not commonsense to rear any animal on the same veld, particularly if enclosed year after year, and season after season, and we have proof of this in the poultry farms of Europe. Poultry farming is the refuge of many men with small capital, and poor health, who have hopes of realising a life in the open air, working at the raising of chickens, and the producing of eggs. Things go on as a rule all right for a couple of years until the runs get what breeders term "*sick*," and the birds begin to go off, sicken and die, when the inevitable expense of shifting the houses, etc., breaks the poultry farmer. I can give lots of instances of such endings to the chicken raising industry on the Cape Flats around Wynberg. It is held by some farmers that certain diseases came in the train of the ostrich. I have heard many Upper and Lower Albany men insist "we never had *Lamziekte* or *Pasteurella* to any great extent until we had the ostriches," and several cattle farmers produce some interesting and startling facts to support their opinion. I know one farmer who some years ago invested in a lot of birds (this was before the days of separate camps, lucerne paddocks, etc.) During the next six years he lost about seventy cows and heifers and oxen from *Pasteurella*. The birds were all over the place. He cleared the lot out two years ago, and his mortality from the disease has dropped to five the first year, and seven the second. I am quoting from his stock book, and I made *post-mortems* on the cattle which died during the past two years, so the disease was *Pasteurella* clear enough. It may be that the germs of *Pasteurella* if passed through the ostrich become stronger and more deadly for cattle. It may be asked does *Pasteurella* in cattle exist on a farm where there are no ostriches? Well, just now such a case does not exist. Everybody has birds, so we cannot settle the point.

ANTHRAX (*MILTZIEKTE*).

Ostriches can die from *Miltziekte*, and as this disease has a special and peculiar bacteria, we can settle the point beyond all arguing by the use of the microscope. A smear of the animal's blood is made on a piece of glass, dried in the air (see the flies do not suck up all the blood), and if put into a box and sent here it will be stained, and an examination made, and if required a report sent by wire. I should advise anyone

having a severe, sudden, and unaccountable mortality amongst their birds to adopt this course. We have a vaccination against Miltziekte, and I do not see why its use should not prove as valuable and efficacious in the case of birds as other stock. I have published the symptoms and *post-mortem* appearances of this disease in the bird, but in case it has been overlooked by some readers, I give it here again. It has been generally supposed that the ostrich, in common with the Avian tribe, possessed an immunity (under natural conditions), to Anthrax; this would appear not to be the case.

The subject of this note was a full-grown hen bird (one of seven) in a wire-fenced kraal. These seven birds had been under observation for seven weeks; the kraal was a clean one, and no case of Anthrax has occurred in the station since its commencement fourteen years ago. The birds were noticed to feed well in the morning, the ration being mealies and prickly pear leaves, and were seen by the manager at mid-day. At 2.30 p.m. one was noticed to be lying on the ground quite dead with the head and neck twisted back over the body. *Post-mortem* was made at once. Blood was quite fluid, and the muscles twitched under the knife. The intestinal tract was almost empty (the crop being full) and congested from end to end. The mucous membrane was much congested and covered with minute areas of hæmorrhage and the lumen of the intestine contained a quantity of clear mucous streaked with blood. The spleen was much enlarged, soft, and dark in colour.

Smears from the blood showed a pure culture of a bacillus, identical, morphologically, and in staining, characteristic with those of Anthrax or Miltziekte, and a slide was submitted to Sir John McFadyean, who corroborated this diagnosis.

I take it that it is needless here to impress upon the farmers the necessity of burning a case of Anthrax, more particularly when we know the habits of the ostrich, and the fact that the disease can be communicated by feeding. When we also know that the germs of Anthrax can live in bones for years, we can see how dangerous must be the frequent habit of leaving a dead bird (cause of death unknown) to rot away, and perhaps infect others which are picking around the carcase. And it is a curious thing that an ostrich will pick up pieces of broken bone from a dead bird, but will not touch the little heap of stones which are there in the skeleton on the veld, as a result of the decomposition of the gizzard; this is a point which has puzzled me many times.

PARALYSIS OF THE LIMBS IN OSTRICHES.

History of the Disease.—Has been noticed by breeders to be on the increase during the past six years and seems to be becoming yearly commoner. Several farmers have sustained severe losses to the extent of many thousands of pounds.

Nature.—Here you get sudden inability to rise, the interference seems to be in the joint where the toes join the legs, these toes are bent on themselves at right angles, and the birds make futile (and if scared, persistent) efforts to rise, sometimes staggering along for a considerable distance on the hocks or heels. (See photos 1 and 2.) The disease is sudden in onset, and confined to certain farms in certain areas. Birds of all ages are affected, principally young birds, but it can be met with from the sitting hen on the nest to the three months' old chick. I have seen birds thus suddenly affected quite yellow with fat, and in the pink of condition. The attendant reported that they were waltzing when let out the morning previously. The appetite remains good, and there seems to be a complete absence of pains.



Fig. 2.—Ostrich Chick affected with paralysis attempting to crawl about on its hooks. Note the contracted condition of the toes.



Fig. 1—Showing Ostrich affected with paralysis attempting to rise.

When first affected the bird makes strenuous and constant efforts to rise, but in a few days gives up the attempt. (Photo 3.) I have kept birds alive suffering from this disease for seven months, and they did not improve a bit. This is a most annoying ailment to get amongst the birds, as they drop at all sorts of irregular intervals, and this makes it very difficult to obtain material for experimental work, as the periods between two cases may run from a day to two months, and one might wait on an infected farm an indefinite time in expectation of a case.

There is a suddenness in onset, and lack of initial symptoms, which puzzle the observer. A full-grown hen sitting on eggs can be affected in one night, and I have no history of a complete recovery, though I have had them get on their legs, and stagger about, but the characteristic, and fatal, stupidity of the ostrich generally leads the reeling animal into a fence, or sluit, where eventually it is found dead from injury or exposure. I can trace no literature upon the subject and feeding, diathetics generally, strain of bird, etc., do not seem to have a bearing on the disease.

Case No. I.—Subject, a valuable chick about five months old, sent in by Mr. B——. Bird was fat and in very good condition, showing the yellow appearance of the skin associated with a well thriving and well-fed chick. Quite unable to rise, and when lifted up the legs remained flexed, as when the chick rested on its heels (photo 2); when forcibly bent, the joints at once sprung back. Bowels seemed quite normal and appetite good, the bird even pecking at its neighbours and eating cut prickly pear and lucerne greedily.

The chick was killed, and bled, and when in the death struggle the legs still remained bent, the backward and forward spasmodic paddling movements being from the hip joint and not the hock.

Post-mortem.—All the pleural viscera, heart, lungs, and contents of the chest were quite normal and free from disease. The stomach contained normal semi-digested food with a few wire worm (*S. Douglasii*) attached to the lining. The gut leading from the stomach (*duodenum*) on being split open was red and inflamed on its inside. The mucous lining was reddened, congested, and thickened, resembling velvet pile, and of a dark maroon colour. This inflammation was traced through the guts for about a third of their length.

The two blind guts (*Caecae*) were congested and stained with blood, and showed traces of inflammation.

Case No. II.—Subject, two ostriches (chicks about three months old) received from Fort Brown. Birds cannot rise, but propel themselves along on their heels (see photo); they eat fairly well, but seem completely paralysed in legs and feet. Both chicks were killed. The contents of the chest cavity, the stomach, etc., were quite normal, but the intestine leading from the stomach (*duodenum*) was congested throughout its entire length. The lining mucous membrane was much inflamed and thickened, with here and there an area or patch of acute inflammation, covered with an exudate or crust. The guts for about half their length showed similar areas and lengths of inflammation. (It was noticed that the red colour of the inflamed mucous linings of the gut became much brighter when exposed to the air for a bit.)

Case No. III.—Subject, an ostrich (seven months old chick) received from Mr. G——. This animal when received was in the same condition, but was kept alive for over seven months; latterly it could walk about, but seemed to have little control over locomotion, sometimes pressing continually against the wall and partition of the pen, and when let loose in the camp went reeling and staggering, sometimes for a hundred yards, occasionally pitching forwards head over heels in a confused heap. Fed well. Bird was killed. Chest organs and stomach normal. The lining of the first

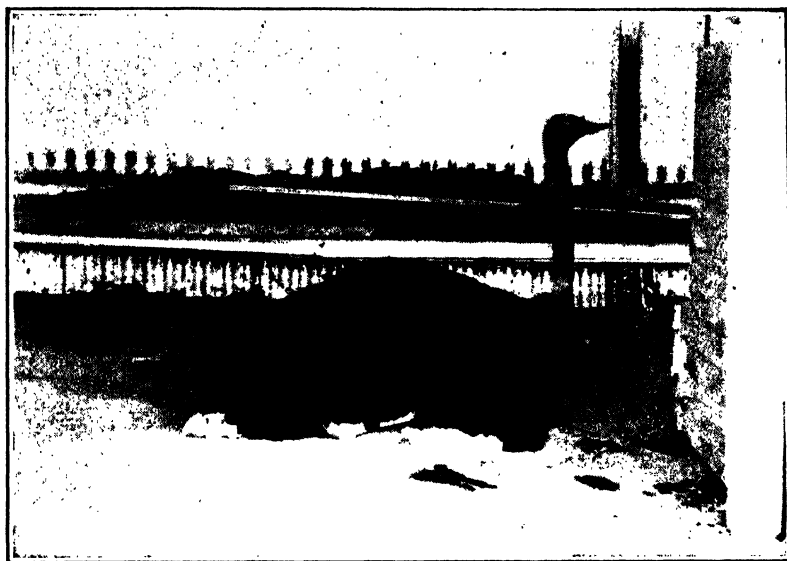


Fig. 3.—Bird in last stage ; note the closed eye. (This was a sitting bird.)

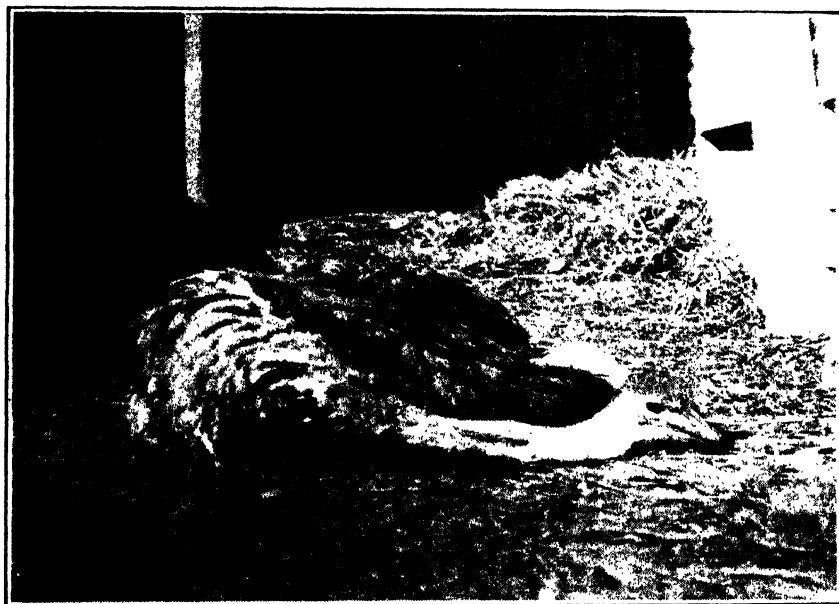


Fig. 4.—Showing position assumed by sick bird in last stages.

gut from the stomach (*duodenum*) was much inflamed, thickened, and covered with a thick croupous exudate, or skin, of a dirty brown colour: on scraping this off the mucous membrane was seen to resemble plush in texture, and vivid crimson in colour; this colouration extended some way down the gut.

These cases and *post-mortem* notes could be repeated indefinitely were there need; it is sufficient if we take them as samples of many.

It is only by studying many cases of a disease and making *post-mortems* on its victims, that we can decide what symptoms and appearances really belong, and belong only, to that disease, and what are chance additions common to any, all, or many diseases. To make this clear, in a case of typhoid, we have a rise in temperature, an increase in pulse beat and a furred tongue, but no doctor would give these as the symptoms of typhoid, though they invariably accompany the other symptoms of the disease, and similarly in a *post-mortem* you can get an enlarged milt, in other things than redwater, but when you get this phenomenon accompanied by certain special appearances, we can then be more certain that it is redwater.

Studying the records and remembering the *post-mortems* on the cases of ostrich paralysis, the only constant *post-mortem* appearance met with was the congestion or inflammation of the bowel leading from the stomach, and the reddened appearance of its mucous lining, accompanied by the deposit of inflammatory matter or exudate on the surface. This lesion was constant, *i.e.*, was met with to a varying degree in all the *post-mortems* conducted, and was not confined to cases of the disease in its early stages, but was met with in cases where the subject had been paralysed and immovable for some months. It was also noticed that the sub-mucous layer of the intestine was thickened and full (infiltrated) of a clear, straw-coloured fluid (this clear straw-coloured fluid is frequently met with as a consequence of the inflammatory process, and forms the cause of swellings, etc., around infected parts).

MICROSCOPICAL WORK.

Smears from the tissue under the inflamed mucous membrane gave an almost (in many cases a quite) pure culture of a short bacillus; this was also met with on the mucous membrane itself after cleaning and scraping with sterile wool.

The Causal Organism: Is a short rod fairly regular in shape. Staining by the ordinary aniline dyes, and does not stain by Gram's method.

Cultural Experiment: Is anacrobic and aerobic (*i.e.*, grows with and without air), and grows fairly well on all the ordinary culture media of the laboratory.

On Plain Agar: A copious white growth along the needle tract, growth slightly raised in centre.

Glycerine Agar: Copious white growth as on Plain Agar.

Malachite Green Agar: Colour discharged along needle tract, copious raised white growth.

Sugar Agar Stab: Growth along stab and on surface, gas evolved.

Sugar Agar Slope: Growth not so free, or plentiful, as on Plain and Glycerine Agar.

Bouillon Plain Glycerine, Sugar: Growth in all. Turbid foul odour.

Potato: Free growth, raised from surface, brown colour, somewhat resembling an old culture of glanders (B. Mallei).

Milk: Not coagulated.

Gelatine Stab: Growth along needle tract, not liquified.

Gelatine Slope: Free white growth along needle tract, with little tendency to spread.

INOCULATION EXPERIMENTS.

Were conducted with Bouillion Culture 24 hours old.

A Cock Ostrich, No. 8—31-10-09.—Received 25 c.c. of a 24 hours old plain bouillion culture, subcutaneously; on the 7-11-09 this cock ostrich No. 8 was down in the kraal unable to rise, crawling about on points of hocks, just like a natural case of the disease. On the 10-11-09 it died with the head twisted round to the flank.

The *post-mortem* showed a few wire worm, but the gut leading from the stomach was *red, congested and inflamed*, and covered in its lining membrane with a thick croupous exudate, dirty grey in colour, and when scraped off showed the mucous lining of the intestine to be of a bright scarlet hue. From this ostrich I obtained and isolated cultures, which when cultivated in various artificial media corresponded to that obtained from a natural case of the disease. Cultures from ostrich No. 8 killed ostriches Nos. 9, 10, and 14 with the clinical symptoms and *post-mortem* appearances just described.

This organism if cultivated from culture to culture loses its virulence and killing power; this can be restored to it in a great measure if the bacillus in question is cultivated in conjunction with the ordinary *Staphylococcus P. Albus* and inoculated into a bird.

In natural cases of the disease the *Staphylococcus P. Albus* is almost invariably present in the sub-mucosae of the Duodenum, and in a good case, killed early, a culture from the clear fluid in the intestinal folds will yield a culture containing these two organisms and these two only.

Source of Infection.—I take it that the organisms do not invade the general tissues of the bird's body, but like diphtheria and tetanus (lock-jaw) remain located in certain parts, and by the toxins and poisons which they elaborate, produce the train of symptoms peculiar to themselves. The symptoms seen in this form of paralysis in the ostrich point more to a toxine poisoning than anything else. The general health of the bird is, as a rule (at all events in the early stages of the malady) excellent, and the tissues loaded with fat, the appetite is good, and the eye bright; of course, as the time goes on the bird becomes thin and dirty, the muscles of the thighs atrophy and waste, and the feathers become matted with the faeces, often affording a breeding ground for maggots.

This poison which is elaborated by the organism in the intestine, acts upon the spinal cord (just as strychnine would) and the symptoms of paralysis are thus produced.

I am convinced that the common if not only source of infection is from contaminated food and water. I know one fine ostrich farm where the disease can be produced in the spring and early summer by turning the birds into a certain patch of lucerne, the disease stopping entirely when the birds are taken away. Another bird farmer who has a farm on which are very old lucerne irrigated lands (dating from the first start of the ostrich industry) lost nearly all his chicks last year. This season he has shifted the birds into high virgin veld, in bush skerns, and feeds the lucerne and rape cut, and so far has had splendid results. I would strongly advise any farmer getting this disease on his farm to knock the affected birds on the head, and shift the troop to clean bare veld, and hand-feed with the cut green crops, and it may even in persistent outbreaks of the disease be necessary to plough and lime the lands.

MILK RECORD.

ELSENBURG COLLEGE HERD.

Subjoined is the Milk Record to the 31st December, 1909 :—

Breed and Cow.	Days in Milk.	YIELD IN LBS.		
		During December.	Total to date.	Daily Average.
FRIESLANDS.				
Cleopatra	242	535	9,066	37·5
Victoria	233	275	7,918	34·0
Vera	191	565	5,211	27·3
Violet	172	595	5,484	31·9
Bell	160	797	6,462	40·4
Belladonna	123	562	2,905	23·6
Rose	56	1,181	2,323	41·5
JERSEYS.				
Gertie	235	367	5,611	23·9
Gwendolen	191	508	4,429	23·2
Grace	191	422	3,726	19·5
Gladys	184	405	4,499	24·5
Gus	141	544	3,247	23·0
Fanny	129	4 3	2,644	20·5
Gilliflower	122	564	3,364	27·6
Glee	75	621	1,722	23·0
AYRSHIRES.				
Queen Dot	180	439	4,259	23·7
Lobelia	169	569	4,471	26·5
SHORTHORN.				
Maggie	170	678	5,136	30·2
CROSS.				
Bessie	191	785	8,126	42·5

AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS.

BEING A COURSE OF LECTURES ON AGRICULTURAL ZOOLOGY, DELIVERED BY DR. J. D. F. GILCHRIST, PROFESSOR OF ZOOLOGY AT THE SOUTH AFRICAN COLLEGE, IN CONNECTION WITH THE TECHNICAL EVENING CLASSES INAUGURATED BY THE SCHOOL BOARD OF THE CAPE DIVISION.

(Continued from Page 709.)

INSECTA.

THE COCKROACH.—(Continued.)

Nervous system consists of a large supra-oesophageal ganglion or brain connected by commissures round the gullet to two sub-oesophageal ganglia, which are connected in a ventral chain to three thoracic and six abdominal pairs of ganglia. Special sense organs are the eyes, which are compound, that is made up of a large number of simple elements; the antennæ, which appear to be organs of touch and smell; the maxillary palps and anal cerci, which are probably tactile organs.

Reproductive system.—The ovaries are tubular structures opening by two oviducts on the lower surface of the eighth segment of the abdomen in a single median aperture. The testes are two small bodies in the fourth and fifth segments of the abdomen; from them pass two vasa deferentia, with two large seminal vesicles opening just below the anus.

Though a convenient type for examination, the Cockroach does not illustrate certain important features characteristic of many insects. Thus in the development from the egg to the adult there is no distinct larval stage such as we find in the *grub* or *caterpillar* stage through which some insects pass after leaving the egg. After a time it becomes quiescent, and, protected by a hard cuticle, or encased in a cocoon of various material (silk in the silkworm) it becomes a *pupa*. It then undergoes a change, or *metamorphosis*, which may be more or less complete, and finally emerges as the adult insect or *imago*.

In other important respects the Cockroach and Locust differ from other insects. Thus the mouth parts may not have *biting* mandibles, but these may become very much reduced, the chief mouth organ being the first maxillæ, which are developed into long *sucking* organs as in Butterflies.

Insects are usually classified according to the nature of their wings, their mouth parts (biting or suctorial) and degree of metamorphosis; and on these lines they may be divided into the following orders:—

I. APTERA or Silver-Fish, Spring-Tails, etc.

Wingless; biting; very little metamorphosis.

- II. ORTHOPTERA or Locusts, Cockroaches, Earwigs, Crickets, etc.
Four wings; anterior stiff and posterior membranous; biting; little metamorphosis.
- III. NEUROPTERA, or Termites, Dragon-Flies, Lace-Wings, etc.
Four wings; membranous with fine network; biting; metamorphosis complete or incomplete.
- IV. HYMENOPTERA, or Bees, Wasps, Ants, etc.
Four wings; membranous; biting and sucking; metamorphosis very great.
- V. COLEOPTERA, or Beetles.
Four wings; anterior hard and posterior membranous; biting; metamorphosis great.
- VI. LEPIDOPTERA, or Butterflies and Moths.
Four large wings covered with scales; suctorial; metamorphosis very great.
- VII. DIPTERA, or Flies.
Two membranous wings; suctorial; metamorphosis very great.
- VIII. HEMIPTERA, or Plant-Bugs, Green-Fly, Lice, Scale-Insects, etc.
Four wings; anterior variable, posterior membranous; suctorial; metamorphosis slight.

Order I.—Aptera, or Wingless Insects.

This order includes the simplest known forms of insects. They have *no wings*. The mouth parts are adapted for biting, and there is very *little or no metamorphosis*. The body is generally covered with minute scales, and the *cuticle is thin*. Other insects also, in the higher groups, have no wings, but there is evidence that these have descended from winged forms, whereas this order is believed never to have reached the winged stage. This complete absence of wings marks them off from all other insects, and it has been proposed to make two large groups of the orders on this basis,—the Apterygota or wingless forms, and the Pterygota or winged forms.

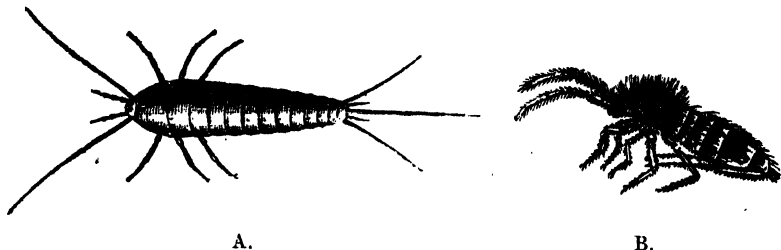


Fig. 64.—A, *Lepisma*, the Silver-Fish : B, *Podura*, the Spring-Tail (règne animal.)

A very common representative of the order is *LEPISMA* (Fig. 64), a small silvery grub-like animal which runs with great rapidity. It is commonly known as the "Silver-Fish," and is found frequently in houses, especially among books and on wall paper, being attracted by the starchy ingredients on which it feeds; clothes which are starched may also be badly damaged by the insect, though it does little harm otherwise. It belongs to the sub-order of the THYSANURA with ten segments in the abdomen, which terminates in three long, jointed processes.

Another sub-order is represented by the Springtails or COLLEMBOLA, such as PODURA (Fig. 64 B.). They have six or fewer segments in the abdomen, and, on the first is a curious tube, which may be an adhesive organ. They receive their popular name from the fact that they can spring a considerable height into the air, not by means of powerful legs, as in fleas or grasshoppers, but by a special projection or spring near the posterior end, which, in a position of rest, is held back by a ventral hook; when released from the hook, the spring throws the animal suddenly into the air, apparently without reference to direction. Some of the forms belonging to the order are occasionally injurious, as for instance SMYNTHURUS.

Order 2.—Orthoptera.

In this order there are two pairs of wings, the *anterior being usually stiff and narrow* and serving as a protection to the posterior, which are large, fan-like and adapted for flying. The mouth parts are adapted for *biting*, there being well developed mandibles. There is *incomplete metamorphosis*, the larva and pupa stage being only slightly indicated in the higher forms, and then only by a gradual increase in size.

The order presents some primitive characteristics. The wings are not important organs of flight, in many cases being rudimentary or entirely absent. Their mode of progression is mainly by running, walking or jumping, and the order has been divided up into groups corresponding to these methods of locomotion. The Cockroach and Earwig illustrate the running forms, the Mantis and Stick-insects the walking forms, the Locust, Grasshopper and Cricket the jumping forms. All three are represented in South Africa, the last exhibiting many striking features connected with the production of sound, etc., and being of special economic interest. The following families may be noted: Forficulidae or Earwigs, Blattidae or Cockroaches, Mantidae or Praying-Insects, Phasmodidae or Stick-Insects, Acrididae or Locusts, Locustidae or Green-Grasshoppers, Gryllidae or Crickets.

Family I.—Forficulidae or Earwigs.

These are very familiar forms, known chiefly by the formidable-looking pincer-like organs or nippers at the posterior end of the body (Fig. 65). One would suppose that these conspicuous organs would have some very obvious use, but, although they doubtless have some important function, this is at present unknown. They are not sufficiently strong to be of much use as defensive or offensive organs. In some forms the wings are well developed, but they seem to be seldom used, and are often absent. The name "Earwig" is probably due to the belief that the insect crawls into the ear of persons asleep, and, although there is not sufficient evidence of the fact, the belief is widely spread in many countries. Though common forms their habits are little known. They are said to be remarkably solicitous as to the welfare of their young.



Fig. 65.—*Forficula*, the earwig.

In Europe the Earwigs often do considerable damage to gardens and even to turnips, cabbages, etc., but in South Africa and other countries generally they do very little damage.

Family II.—Blattidae or Cockroaches.

These are well represented in South Africa, though imported forms are now found all over the world, especially at sea-ports, such as the American Cockroach, PERIPLANETA AMERICANA, and the smaller German

Cockroach, *P. GERMANICA*, with two dark stripes on the thorax. Another imported cockroach, sometimes called the "black beetle," *P. ORIENTALIS* (Fig. 61), belongs to this order, and is not a true beetle, which belongs to an entirely different order, the Coleoptera. They do little damage, except in stores and ships, and can be kept down by Persian insect powder. They are vegetable feeders, and depend on their running powers for safety.

Family III.—Mantidae, or Soothsayers, Praying-Insects, Hottentot-Gods.

This interesting family of insects, which is well represented in South Africa, is characterised by the great development of the anterior legs, which are held in a characteristic attitude suggesting their popular name (Fig. 66, A.). These organs, however, are by no means for devotional or sooth-saying purposes, but for the capture and devouring of other insects, sometimes larger than the Mantidae themselves. They are in reality among the most ferocious of insects, and their dangerous character in this respect is increased by their close resemblance to surroundings, so that their presence cannot easily be detected. They resemble

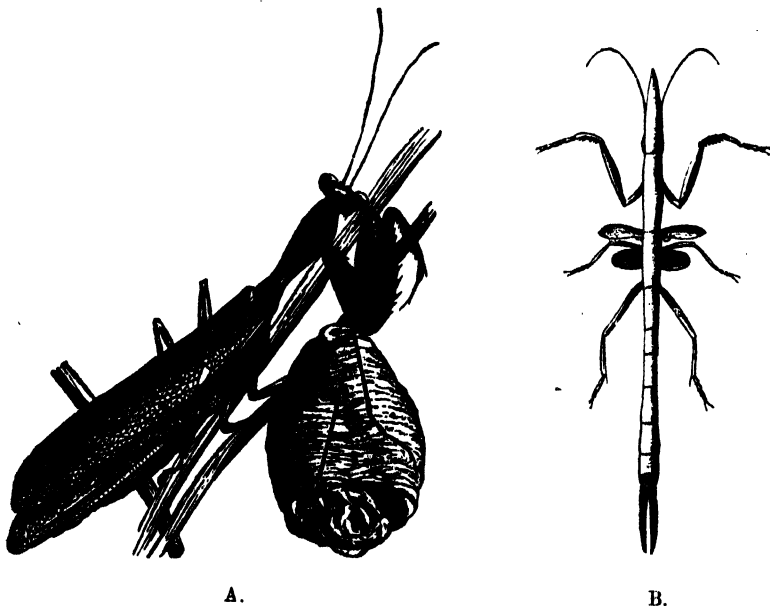


Fig. 66.—A, An African *Mantis* or Hottentot-God with egg-mass; B, *Pyrgomantis singularis*, S. Africa, a mantis which resembles a Stick-Insect. (From *The Cambridge Natural History*, after Westwood.)

green leaves, twigs, and even flowers, and one South African form, *Pyrgomantis singularis* (Fig. 66 B.), closely resembles the harmless Stick-Insects. The Mantidae form a capsule for their eggs; this is attached to a twig, and the young escape in a peculiar manner, remaining suspended for some time by threads like spiders.

Family IV.—Phasmidae or Stick and Leaf-Insects.

These insects often present a remarkable resemblance to sticks, leaves and other vegetation. They are harmless vegetable feeders, and apparently depend for protection on their close resemblance to the surroundings. Their elongate form is due largely to the long meso-thorax, the prothorax being small. They are not numerous represented in South

Africa, the largest being species of *BATRACHODERMA*. *BACILLUS STELLENBOSCHUS* (Fig. 67) is a representative of moderate size named after the district in which it was first found.

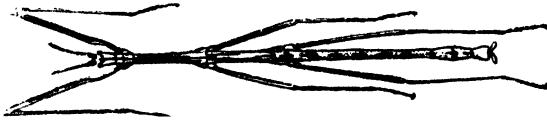


Fig. 67.—*Bacillus stellenboschus*, a Stick-Insect first found at Stellenbosch.

Family V.—Acridiidae, or Locusts and Grasshoppers.

These are more active forms than the runners and walkers we have been considering; the hind legs are well developed and have long, broad femurs or thighs, well adapted for leaping. Certain sensory organs are conspicuous, perhaps in co-ordination with their more active habits; thus they have both compound and simple eyes; auditory organs are present on the first abdominal segment (Fig. 70), and many have the power of producing sounds more or less musical.

South Africa has some peculiar and striking forms, as for instance *PNEUMORA SCUTELLARIS*, the male of which has a sound-producing organ on the abdomen, which is greatly inflated and probably intensifies the sound. It is known popularly as the "Blaasop" from its inflated appearance. It is coloured a uniform and inconspicuous green. The female (Fig. 68, B.), on the other hand, can produce no music, but makes up for this by her gaudy decorations of light green with white markings of a pearly colour. The group, *Pneumorides*, to which this insect belongs is peculiar to South Africa.

Another striking South African form is *XIPHOCERA* (Fig. 68, C.). It is well adapted for desert life, the rough wingless body having the tint of the soil on which it is found.

A third South African form found in the Karroo may be mentioned. It is one of the largest of the Acridiidae and is known as the Toad-Locust, *METHONE ANDERSSONI* (Fig. 68, A.) as, in a crouching attitude, it closely resembles that animal, though, so great is its similarity in colouring and general form to the stone, gravel or sand of the desert soil in which it occurs, that it can only with difficulty be detected. Like many animals so protected, its movements are slow and infrequent. When disturbed, it scarcely moves, but makes a peculiar threatening noise. Its wings are quite rudimentary, but it has large broad hind legs, which are, however, of little use in locomotion. It is by the rubbing of the hind legs on the body that, by a complicated mechanism, the sound, or sounds, for there seem to be different kinds, are produced.

Locusts.

The name "locust" is a popular one, and is sometimes applied to various members of the family Acridiidae. It is, however, more frequently applied to those members of the family which occasionally appear in large swarms, moving about in search of food. "Grasshoppers," on the other hand, may occasionally increase rapidly in numbers, and cause considerable damage locally, but do not migrate.

South African Locusts.

There are two kinds of migratory or plague locusts in South Africa, the Brown and the Red.

PACHYTILUS SULGICOLLIS, THE BROWN LOCUST, is characteristic of the Western and drier regions of South Africa. It might also be called the desert locust, as its permanent home is the Kalahari Desert, from which it occasionally migrates in large swarms to the South, East, and West. Eggs are laid usually at the beginning of winter, but may be deposited throughout the month of June to September. Hatching generally takes place at the beginning of summer (October, but may be from September to

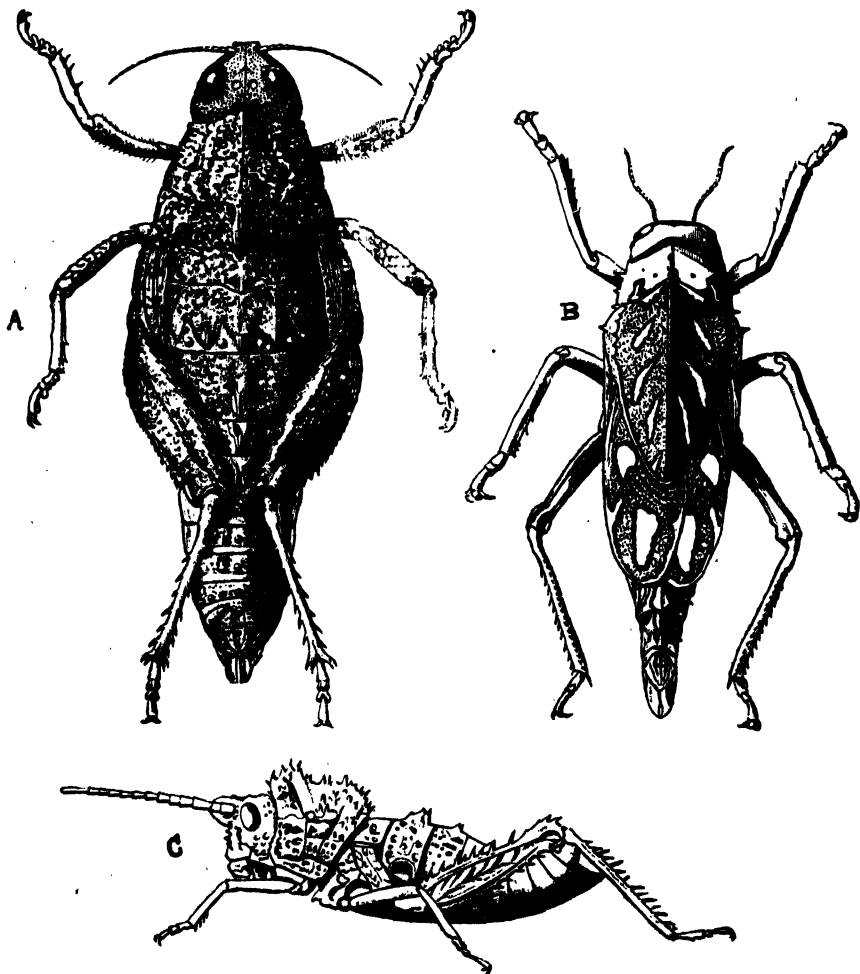


Fig. 68.—Some peculiar South African Orthoptera; A, *Methone anderssoni*, the Toad-Locust of the Karoo, natural size; B, *Pneumora scutellaris*, female; C, *Xiphocera usina* (From *The Cambridge Natural History*.)

January). The winged locusts appear usually about the end of December. It is known that the eggs of this locust may remain in the ground for several years, in a state of suspended animation, and that they will only develop when a considerable amount of moisture is present. The length of time has been variously stated; farmers generally believe that this may be as much as ten years or more, and it has been demonstrated (Lounsbury) by actual experiment that they may survive nearly four years at least. Great

numbers may thus accumulate in the soil, and this probably explains the fact that the most severe plagues of locusts occur after a wet season following a long drought.

There seems to be an instinct in the young to return to the original homes of their parents in the North; when on the move northwards nothing can stop them, and they will continue their journey over deserts and floods at whatever sacrifice. It is related* how one day vast swarms of "voet-gangers" (young locusts) appeared on the banks of the Vaal River, which was then in flood. They wandered up the river for several days, as if

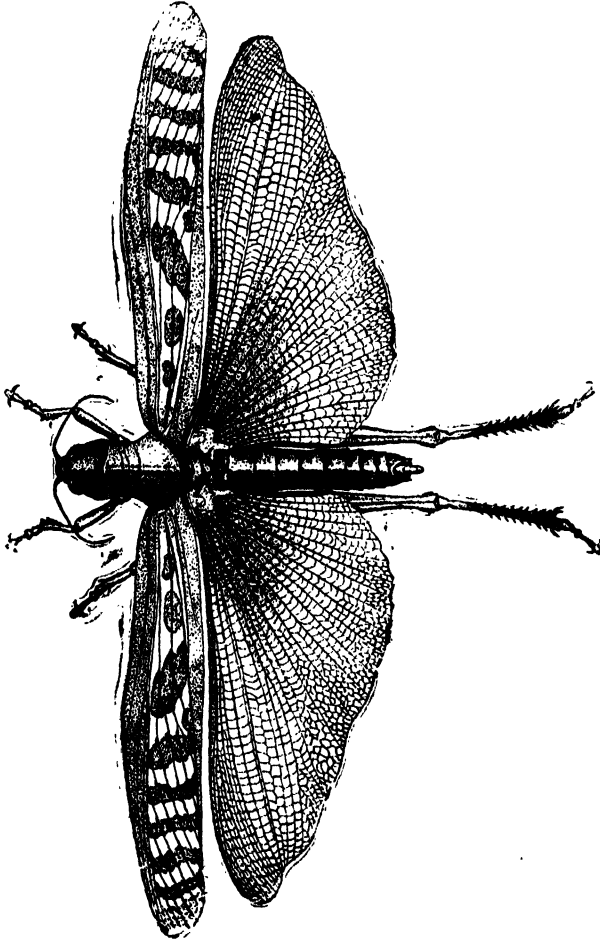


FIG. 69. --The Red Locust of S. Africa, *Cyrtacanthacris septemfasciata* or *aridum purpuriferum*.

searching for a crossing, and coming to some projecting rocks they paused for a time, as if considering the possibility of a crossing, but finally passed on. Three days afterwards they returned to the same place, and plunged into the swollen river. Many were carried down and drowned, but some of the vast multitude succeeded in scrambling on to the opposite shore. Locusts are bad swimmers, but they are good climbers, and, when a mass

* Locusts and Locust Birds in South Africa by Mrs. Barber. Tr. S. Afr. Phil. Soc. i, 1880, p. 193. The truth of the generally accepted statement as to the return movement of the Hoppers is not conclusively established. They often seem to travel eastwards (towards the rising sun).

of them plunges into the water, they form little floating islands, the submerged individuals scrambling up on top, so that few may be drowned before the whole drifts on shore.

There is no evidence of any general return of winged Brown Locusts to the North.

CYRTACANTHACRIS SEPTEMFASCIATA (*ACRIDIUM PURPURIFERUM*), THE RED LOCUST (Fig. 69), is characteristic of the East Coast of South Africa. It is more of a tropical species than the Brown, and penetrates further inland in the Northern Territories. It is not greatly different from *A. PEREGRINUM*, the locust of North Africa, which is also probably the plague locust mentioned in the Book of Exodus. Its permanent home is not known, and it may be absent for very long periods from these regions. It may spread over part of the area of the Brown Locust, just as the Brown may extend over the area of the Red, so that in all the South African Colonies both kinds may occasionally occur. It is a larger kind than the Brown Locust, and may further be distinguished from it by its posterior wings, which are often of a red colour. Should there be any doubt, the presence of the prominent spine on the thorax, in front of the bases of the fore legs, in the Red Locust will definitely determine it, as this spine is absent in the Brown. Unlike the Brown Locust, the Red prefers humid conditions to dry; its eggs do not have the same power of resistance to adverse surroundings, and perish in excessive dryness or humidity. It deposits its eggs much later in the year than the Brown (in October to December). The young hatch out in about thirty days after the eggs are deposited. The migration of the Red Locust in its winged form is generally South and West from the East Coast between November and March.

PHYMATEUS MORBILLOSUS may be mentioned as an example of a locust in South Africa which is non-migratory, and therefore rather to be termed a grasshopper. It is a large form, and is often very brilliantly coloured, the head and thorax being vermilion red.

Structure of the Locust.

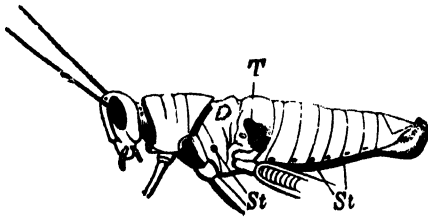


Fig. 70.—Head, thorax and abdomen of an *Acridium* seen from the side. *St.*, stigmata; *T.*, Ear or tympanic organ. (From *Text Book of Zoology* by Clans & Sedgwick.)

The structure of the body of the locust (Fig. 70) is on the same plan as that of the cockroach. It is, however, more compressed from side to side, and the segments of the abdomen are more evident. In addition to the large compound eyes, there may be seen small single eyes or ocelli, represented in the cockroach only by a spot.

The coxa of the leg is not so well developed as in the cockroach, and the tarsus has three joints in place of six. The hind legs are enlarged, and have a stout elongate tibia, which can be rubbed against a vein of the first pair of wings, so as to produce a chirping noise. There is an ear or auditory organ situated on the first segment of the abdomen.

Life History of the Locust.

The eggs are laid in little holes made by the female in the ground (Fig. 71). They are small elongate brown objects, and from 50 to 100 are packed closely together in capsules, which contain an adhesive fluid. The enemies of the locusts, which are numerous at all periods of its life history, appear even at this early stage in the form of parasites, and of insects, birds, and mammals, which devour them.

The young (Fig. 72), when it hatches from the egg, is a small larva, not like that of other insects, but already resembling the adult, though without wings. On leaving the egg the young locust casts its skin, and (in *A. peregrinum*) is then of a green colour, which rapidly becomes brown, and, within twelve hours, black. Another moult takes place in six days, and the black colour is spotted and banded with white and a rose-coloured streak appears on the sides of the body. The body then becomes of a general rose colour, on which account the Brown Locust at this stage is designated a "Rooibaatje" by the South African farmer. Wings begin to grow but it is not until several weeks after hatching that the adult flying stage is reached, and meanwhile it has to progress by walking, and is known in South Africa as a Voetganger or Hopper (Fig. 72). It is to be noted that there is no resting or pupa stage, and the metamorphosis, therefore, is described as incomplete.

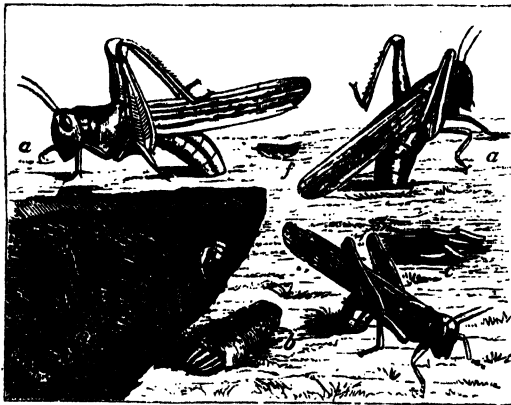


Fig. 71.—Locusts (*Caloptenus spretus*) depositing eggs, *a* : *b*, case containing eggs, taken out of the ground and end broken open : *c*, eggs : *d*, *e*, ground removed to show position of egg capsules, and how the mass of eggs is deposited : *f*, mass of eggs covered up.

At a very early stage—in fact, soon after hatching—the locusts exhibit a remarkable gregarious instinct, collecting together in troops or swarms, and a general migration may begin; in South Africa the migratory instinct is exhibited in the Voetganger stage. After favourable conditions for hatching occur, the young locusts from the various nests come together in large hordes, eating up everything that is green, and hopping on to new pastures. They are voracious eaters, and very speedily destroy all vegetation in their course.

In about 50 to 70 days after hatching the South African locusts begin to assume the fully winged and flying form, and vast swarms of them may migrate long distances. Though very little active flying is carried on, their movements being mostly with the wind, the swarms of successive generations seem to take the same direction, and if the wind be unfavourable will, it is said, wait for a more suitable opportunity. The size of such swarms is often very great, and they may be seen, as far as the eye can reach, passing over a given spot for days. In one case in South Africa the swarm was 15 miles across its front, and took two or three days to pass. It has been calculated* that one swarm that passed over the Red Sea in November, 1889, covered an area of 2,000 square miles and weighed 42,850 millions of tons. It has been found that the swarms appear after

* Carruthers in *Nature*, XII. 1889, p. 153.

a considerable interval of years, a fact which may be accounted for by unfavourable conditions of hatching, and migrations taking place only when there is an excess of individuals. In some countries, Belgium for instance, though the migratory locust is present, it never gives rise to swarms.

Various means of combating the plague have been adopted, though in some cases so sudden and apparently inexplicable has been its appearance that there is little wonder that, to those ignorant of the life history of the insect, the phenomenon has assumed the aspect of a supernatural visitation, not lightly to be interfered with, lest a worse plague should follow. Hoppers may be

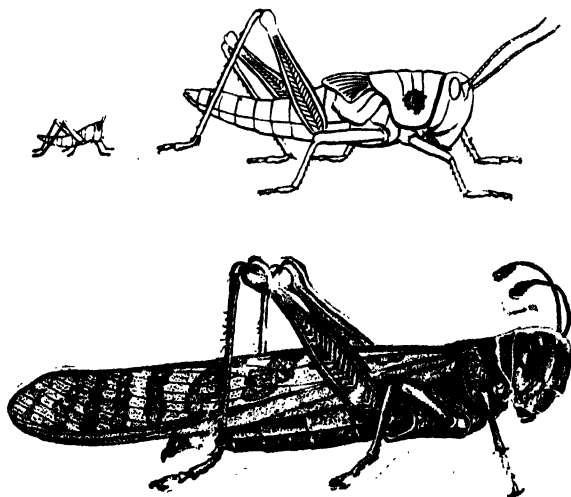


Fig. 72.—Stages in the life-history of the Red Locust: young after hatching, Hopper or Voetganger and adult.

driven off or captured in trenches or screens or poisoned by a sweetened solution of arsenite of soda, the last being by far the most effective way of dealing with them. The winged forms are more difficult to deal with.

The winged locust, like the hopper, has numerous enemies, chief among which are various kinds of "locust birds." The White Stork (*Ciconia alba*) and the true locust bird (*Glareola melanoptera*), a smaller form, are the chief enemies. The first is an inhabitant of Europe, which it leaves, however, during the winter, and comes to South Africa for the locust season. The second also does not breed in South Africa. Another stork, the White-bellied Stork, helps to keep down the locusts, as do also several species of South African hawks, guinea fowls, pheasants, spreeuws, the wattled starling, etc.

Family VI.—Locustidae or Green Grasshoppers.

The name of this family is somewhat misleading. It contains none of the insects usually termed locusts, and *Locusta*, a genus belonging to this family, is not the locust, as might be supposed from the name, but a green grasshopper. They are more fragile than the Acridiidae, and do not migrate; the antennae are long and delicate; hind limbs are weaker, though longer than the other two, and there is often an auditory organ on the front tibia. These and other features mark them off distinctly from the Acridiidae. They often present striking resemblances to green leaves, and are usually found on vegetation.

Locusta veridissima, the green grasshopper of Britain, and *Microcentrum retinerva*, the Katydid of North America, are examples of the family. In South Africa, where green vegetation is not so abundant, the family is not well represented. The "Korenkrekel," e.g., *HETRONES* (Fig. 73) are, however, common enough; these are rather stoutly-built insects with the first pair of wings much reduced and the second absent. The first pair are capable of producing a shrill piercing sound. An interesting

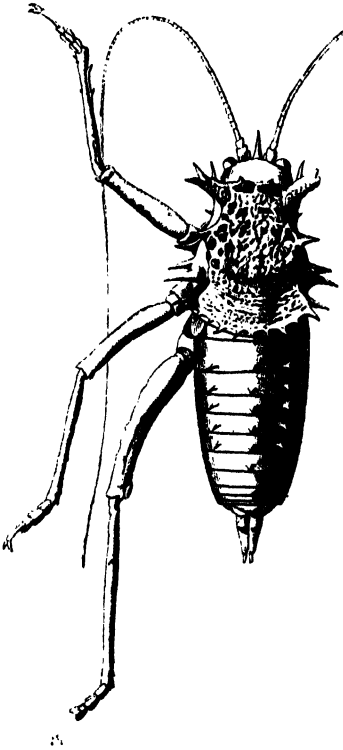


Fig. 73.

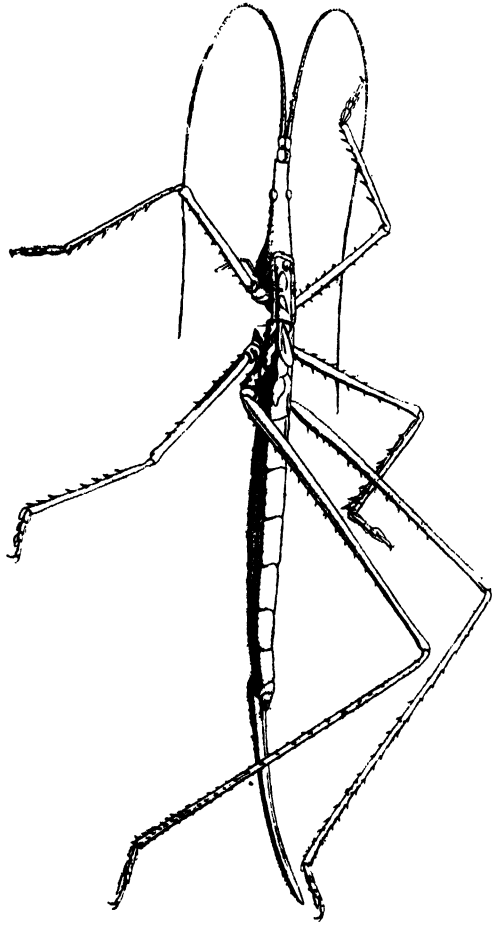


Fig. 74.

Two S. African Locustidae.

Fig. 73.—The Korenkrekel, *Hetrones*. Fig. 74.—*Peringueyella jocosa* (after De Saussure.)

South African representative of the family may be mentioned, *PERINGUEYELLA JOCOSA* (Fig. 74), an insect of a ferocious character, though simulating in appearance the harmless Stick-Insects, like some of the Mantidae.

Family VII.—Gryllidae or Crickets.

The Gryllidae are closely allied to the Locustidae. The first pair of wings are, however, differently shaped, the inner part lying flat on the body, while the outer margin is bent over the sides; the number of joints in the tarsus is usually three; the hind legs are leaping organs.

The musical powers of the Cricket are well known, indeed the sharp, shrill chirping of the South African house cricket, *Gryllus domesticus* (CAPENSIS), (Fig. 75), is more familiar to most persons than the insect itself. The sound is produced (by the male only) by the rubbing of the front wings against each other, and it can be modified by holding the wings at different angles and by raising the anterior part of the body. In co-ordination with these musical powers, we find that the Gryllidae have ears or tympana, which are situated on each front leg.

The burrowing forms, such as *Gryllotalpa*, the Mole-Cricket (Fig. 75), are commoner in South Africa than those found in vegetation. This cricket lives, like moles, in burrows in the ground, and the tarsi and tibia of the leg form a shear-like instrument adapted for cutting roots, a habit which sometimes makes the creature an objectionable neighbour, though it is believed to be chiefly carnivorous in habit. Some damage to vegetation in South Africa had been stated to be due to this cricket. It can emit a sound, consisting of a "dull jarring note."

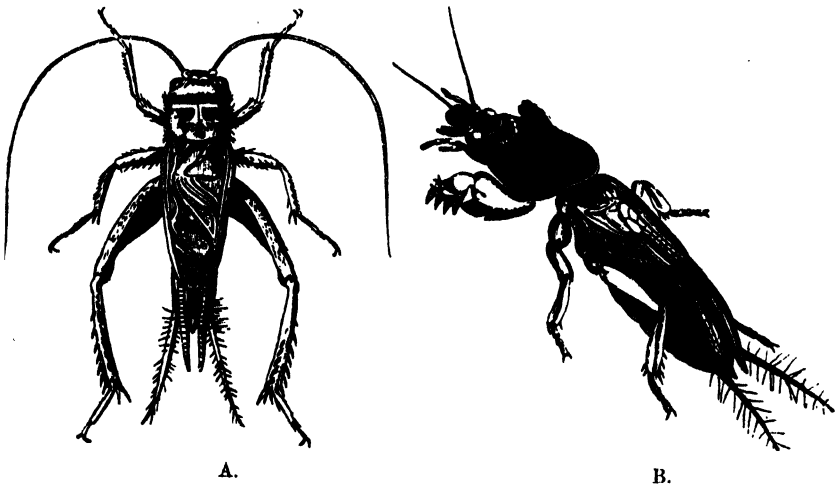


Fig. 75.—Crickets. A, the House-Cricket, *Gryllus domesticus*, male: B, the Mole-Cricket, *Gryllotalpa vulgaris*.

Order 3.—Neuroptera.

In the Neuroptera the wings are more important organs of flight than in the Orthoptera. There are *two pairs, both membranous*, and usually with a *network of veins or nervules*. Some, however, are wingless (Mallophaga), and some have both winged and wingless forms (Termites). The *mouth pieces are adapted for biting*, and the *metamorphosis is complete or incomplete*.

This rather heterogeneous order includes the White Ants or Termites (not allied to insects generally known as Ants, which belong to another order), Bird-Lice or Mallophaga, Dragon-Flies or Odonata, Book-Lice or Psocidae, May-Flies or Ephemeridae, Ant-Lions or Hemerobiidae, Caddis-Flies or Phryganeidae, and the Black-Fly or Thrips, which is, however, usually put into a separate order of its own.

Family I.—Termitidae, White Ants or Termites.

These are the most interesting, and, from an economic point of view, the most important of the Neuroptera. They live in colonies, and the mounds, which some of them build, often form conspicuous objects in the South African landscape. The social life of the White Ant is one of the

most complex to be found in the animal kingdom, and the Termites of Africa are the most remarkable in this respect. Thus the members of the community may be specialised into workers, soldiers, winged males and females, and males and females which have lost their wings (Fig. 76). Even these do not by any means represent the variety of forms and their different stages, which may occur in a colony.

A new Termite colony is begun by winged males and females which leave the parent colony. These are the perfect insects, and probably approach nearest to the ancestral form. After the flight, swarms of these winged forms may be observed settling down and casting off their wings. A fertilised female is captured by a number of workers, which start a new colony. There is usually a single queen and king to each colony, and they never leave the nest, this being a physical impossibility in the case of the queen, which grows to an immense size, and is often enclosed in a special royal apartment or cell. On the royal pair devolves the duty of reproducing the colony, and the whole life of the community centre round them.

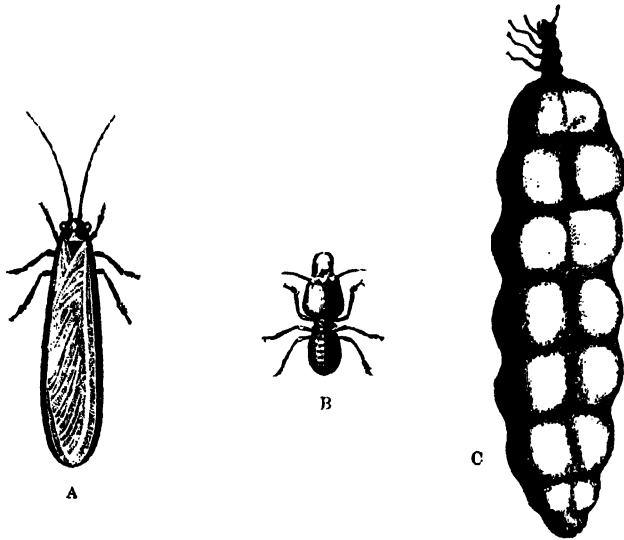


Fig 76. The White Ant (*Termes bellicosus*). A, a winged male; B, a soldier; C, a queen.

It used to be believed that the destruction of the queen entailed that of the entire colony, and an effective method of exterminating ants was thought to be the finding and destroying the queen; it is now known, however, that there are reserve queens and kings, which, by special treatment, may fulfil the functions of the lost queen and king. These reserve royalties may increase unduly in numbers, in which case the colony adopts the effective and economical plan of devouring them. The organisation is, therefore, more of a democracy than a monarchy. The queen produces an immense number of eggs—in some cases from 80 to 90 thousand per day. These are carried away and cared for by the community. The young which arise from these eggs are at first all alike, but, by special treatment, different forms are produced. In those destined to become workers, the development is arrested, the sexual organs, eyes, etc., remaining rudimentary, while the alimentary system is well developed. It is the duty of these individuals to perform all the ordinary work of the colony, and they apparently are the real governing body. The soldier is also an arrested form, but with greatly enlarged head and jaws.

The nests of the White Ants may be inhabited by several species, as many as five having been found in a single mound in South Africa. Along with them there may be various other animals, apparently living in harmony. They do not appear, however, to have slaves, like some other social insects, though they cultivate fungus beds.

The mounds which the Termites build are, in the Northern region of South Africa, often of very large size, being sometimes 12 to 15 feet in height. The Cape Ant-Eater or Ard Vark and the Armadillo live on ants, and in this and other ways the mounds are often injured. They may be repaired, but when the ground is cultivated, the ants seem to have intelligence enough not to attempt to construct others, though they remain active in the soil. Some kinds never build mounds, but live in long tunnels, which they form in the soil or in wood.

Termites may do extensive damage in various ways. Those which live in burrows in the ground are the most noxious, as they attack various kinds of plants, including grain and vines. One species, *HODOTERMES*

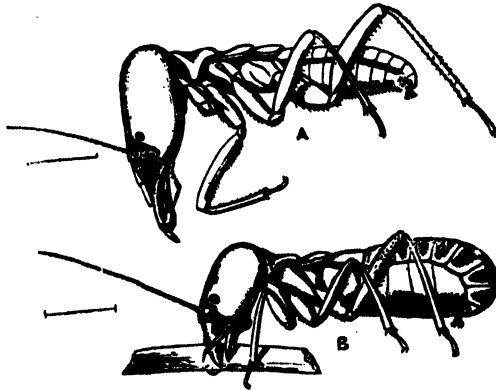


Fig. 77.—The Hout Kapper, *Hodotermes havilandi*, a White Ant that does much damage in S. Africa; A, a soldier; B, a worker. In life the head is carried horizontally, so that the piece of grass sticks up like a flag-pole. (From *The Cambridge Natural History*.)

HAVILANDI (Fig. 77), the Hout Kapper or Rijsmier, cuts up grass, growing grain, and leaves of plants into short lengths, and carries them down into its burrows. This is the only Termite of much practical importance in the Southern part of South Africa, but, in the North, much damage is often done to wooden buildings by other kinds. Their habit of avoiding the light and working in concealment prevents their detection before considerable damage has been done by their tunnelling in the wood. It is recorded that so much damage was done in this way in Jamestown, the capital of St. Helena, that practically all the wooden buildings had to be destroyed and new ones erected. Not only do they destroy dead wood, but they may attack the bark of most kinds of trees.

They are difficult to eradicate in a building or in cultivated ground, so that steps have to be taken to get rid of them on any plot of ground on which it is proposed to build houses or plant trees. The old method of capturing and destroying the queen, we have seen, is founded on insufficient knowledge of their habits. They may be got rid of by pouring two or three ounces of carbon bisulphide into their nests and closing the hole, or by placing arsenic mixed with syrup into their galleries. Some feed on it and die, and, as dead ants are usually eaten by their fellows, the poison is soon spread.

Family II.—Mallophaga, Bird-Lice or Biting-Lice.

These are to be included in the family of Neuroptera, though they have no wings (Fig. 78). They are small, flat insects with large heads, and are found among the feathers of birds and hairs of mammals. Their mouth parts are adapted for biting, and not for piercing, like those of the true lice. Thus they are not parasites like the true lice, which are often found with them, and which live on the blood of their host. For instance, *TRICHODECTES LATUS*, a biting louse, may be found with *HAEMATOPINUS PILIFER*, a true sucking louse on the dog. The Mallophaga live on the cast-off epidermal structure of the skin, and would, therefore, appear to

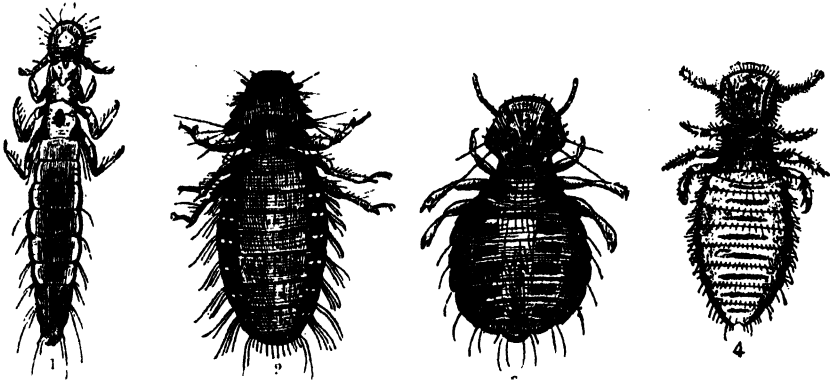


Fig 78.—Mallophaga or Bird-lice. 1, *Lipeurus*; 2, *Menopon*; 3, *Goniocotes*; 4, *Trichodectes*. (Theobald's *Agricultural Zoology*.)

be beneficial as cleaners; this may be the case in a state of nature, but in the domestic animals they often cause irritation, in chicks, for instance, leading to a stunted growth.

They resemble parasites, however, in their adaptation to a particular host, away from which they cannot long survive. Different kinds are even confined to different parts of their host. Four genera are commonly found on fowls: *GONIOIDES*, under the wing; *GONIOCOTES* (Fig. 78, 3), on the rump; *LIPEURUS* (Fig. 78, 1), between the barbs of the wing feathers; and *MENOPON* (Fig. 78, 2), which wanders all over the body. This last is the one that gets on to a person plucking a fowl, but will not long survive away from its proper host. One genus, however, *TRICHODECTES* (Fig.

78, 4), is found on dogs, sheep and mammals generally.

A dust bath is the natural check to the increase of the parasites on fowls, and in special cases a dressing of mercurial ointment is effective.

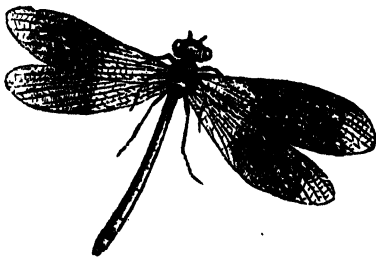


Fig. 79.—A Dragon-Fly, *Calopteryx virgo*. (Railliet.)

Family III.—Odonata or Dragon-Flies.

These are typical Neuropterous insects, with four well-developed and nearly equal wings, with dense network of nervules (Fig. 79). They are carnivorous, both in their larval forms, which feed on aquatic insects, chiefly on mosquito larvæ, and in the adult stage, in which they feed on mosquitoes, etc., on the wing. They are one of the most useful insect

destroyers, and have large heads, well-developed eyes and powerful mandibles. In South Africa the family is not particularly well represented, and those which do occur present no special features.

Family IV.—Psocidae or Book-Lice, Death-Watches, etc.

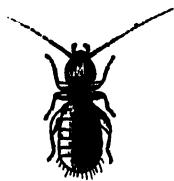


Fig 80.—The Death-Watch or Book-Louse, *Atropos divinatoria* (from *The Cambridge Natural History* after M'Lachlan).

This family includes small soft-bodied forms. A familiar example is the Book-Louse, *ATROPOS DIVINATORIA* (Fig. 80), which is wingless, and feeds on starchy matter, thus corroding the surface and lettering of books. It is sometimes known as the "Death-Watch," and is supposed to produce the well-known knocking noise, which, in the dead of night, seems to have the sinister significance expressed in its popular name. There is, however, some doubt as to whether or not it is the insect that really produces the noise, and not a beetle (*Anobium*), which is known to do so, and is called the Greater Death-Watch.

Family V.—Epheméridae or May-Flies.

These types of a brief or ephemeral existence may be mentioned. In their earlier stages they live in water, some of them having gills at the posterior end of the body, and are active feeders on vegetable matter and even on other larvae. They may live longer than any other insects at the same stage of development, but the life of the perfect winged insect or imago (Fig. 81) is a brief one, varying from a few hours to a fortnight in different species. This adult has no functional mouth, and the alimentary tract is inflated into an air sac, which lends buoyancy to the body in the brief nuptial dance of these fragile insects.

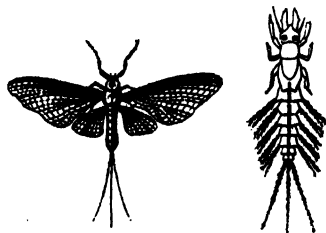


Fig 81.—The May-Fly, *Ephemera*, and its larva, showing gills (from Parker and Haswell after Guérin and Percheron).

Family VI.—Hemeroibiidae or Ant-Lions.

This family is characterised by the mouth parts, which are suctorial in its early life and biting in the adult. The Ant-Lions have long attracted the attention of naturalists, on account of the peculiar habits of their larvae. These form, in loose, sandy, dry ground, little pits by digging



Fig 82.—The Ant-Lion, *Myrmoleon formicarius* (a), and its larva (b).

into the soil, collecting some of it on their head, with the aid of their front claws, and by a sudden jerk throwing it some distance away. This is repeated, till finally a little funnel-like pit is formed, at the bottom of which the larva buries itself, and await its prey. Should some unwary insect,

such as an ant or a fly, stumble over the edge of this pit, the larva becomes suddenly active and begins throwing sand at its victim, which thus rolls down the loose, sandy slope to the bottom of the pit; here it is seized in the powerful jaws of the Ant-Lion, which sucks its body dry and tosses away the empty skin. MYRMELEON (Fig. 82) is an example of these insects.

The Aphis-Lion, HEMEROBIUS, has also an interesting larva, which is of practical utility in the destruction of plant-lice (Aphides). It sucks out the juices of its prey, and utilises the skins by placing them, along with other debris, on its back, perhaps as a lure to other victims, or as a protection from the observation of its enemies. The adults of these larvae are known as Lace-Wing Flies, many of which are beautiful forms with greenish-yellow bodies, golden eyes, and transparent lace-like wings.

Another genus of the Lace-Wing Flies is CHRYSOPA, or Golden-eye, (Fig. 83), which occurs in South Africa, and is said (Ormerod) to be of practical importance, as its larva feeds on the destructive "Australian Bug" or Dorthesia. The eggs of the Golden-eye are small stalked objects on the under side of leaves.

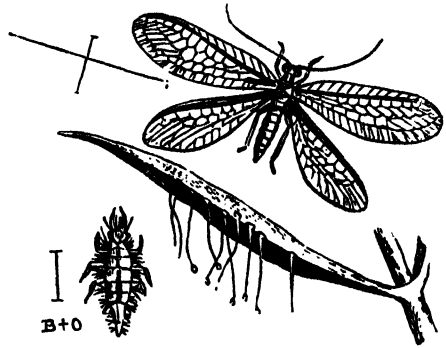


Fig 83.—A S. African Golden-Eye, *chrysopa* sp. Insect and larva magnified, with lines showing natural size. Sketch showing appearance of stalked eggs of *Hemerobiidae* (from *South African Insects* by E. A. Ormerod).

Family VII.—Phryganeidae or Caddis-Flies.

Caddis-Flies are moth-like insects, but with wings covered by hairs, not scales. The Caddis-Worms, familiar objects in streams and pools, are their larvae, which are enveloped in cases or tubes, constructed of pieces of vegetable matter or sand and stones. The scaly head and powerful jaw of the larva may be seen, protruding from the end of the tube.

Family VIII.—Thripidae or Black-Fly.

These are sometimes placed in the Neuroptera, but are usually considered to be a separate order of insects. They have four wings, which are narrow and provided with fringes (Fig. 84). The mouth parts resemble the biting organs of the Orthoptera and the sucking

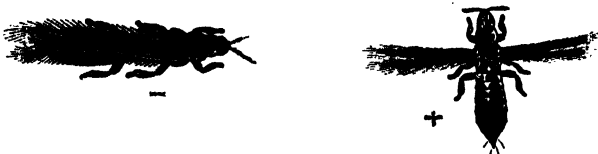


Fig 84.—The Black-Fly, *Thrips cerealium*, which is often harmful to corn. The two larger figures show the wings closed and expanded: the smaller figures indicate the natural size (Curtis).

organs of the Hemiptera. They may be found in the developing blossoms of plants, and often cause considerable damage to crops and to plants in hot-houses by attacking the developing ovaries. THRIPS CEREALIMUM is often harmful to corn.

NOTE ON AN INTESTINAL PARASITE OF THE OSTRICH.

By WALTER JOWETT, F.R.C.V.S., D.V.H., Cape Town.

The following observations relate to a small nematode (round worm) which was recently handed to the writer by the Chief Veterinary Surgeon of the Colony (Mr. J. D. Borthwick, M.R.C.V.S.). This gentleman whilst conducting a *post-mortem* examination on an ostrich in the Oudtshoorn Division noticed the presence in the caeca and the terminal portion of the small intestine of a number of small round worms about the size and thickness of an ordinary wire pin, all with their mouth parts attached to the lining membrane of the bowel. Nine of these were removed, placed in a preservative fluid, and subsequently handed to the writer for examination.

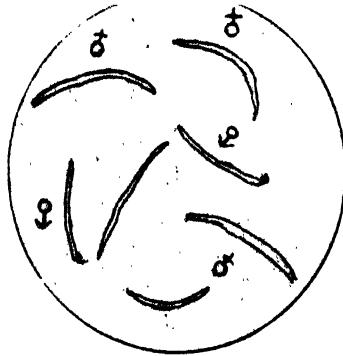


Fig. 1. *SCLEROSTOME* from intestine of ostrich (natural size).

The following is a brief description of the parasites:—The body of the worm is white or yellowish white, rigid, straight or slightly curved, of cylindrical form, roughly about half a millimetre broad at the centre (the widest part of the body), tapering slightly at either extremity. To the naked eye, the worm appears smooth, but examined through the microscope the cuticle is seen to be finely striated in a transverse direction. Size: Males, 12 to 13 mm. Females, 16 to 17 mm. long.

At the summit of the cephalic extremity is placed the orbicular mouth. This is maintained widely open by means of chitinous rings, and is furnished with a ring of sharp teeth, and outwardly six papillae. The mouth opens into an infundibuliform cavity—the buccal capsule, which latter is strengthened in a longitudinal direction by the presence of a rib or band.—(See fig. 4.)

The buccal capsule opens into an oesophagus—a narrow tube with thick muscular walls—this in turn leads into the intestine which runs an almost straight course to the hinder end of the body, finally terminating at the anus, which is terminal or rather sub-terminal.

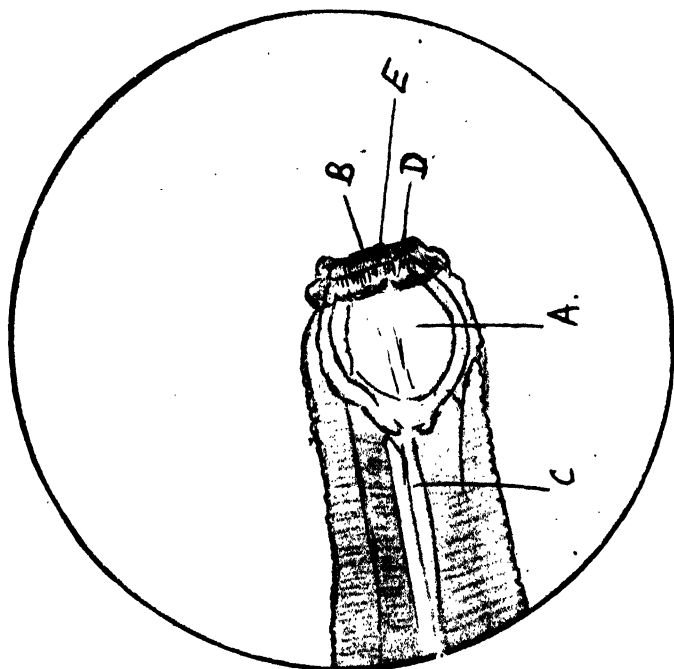


Fig. 2.—HEAD OF MALE.—A. Buccal Capsule. B. Mouth. C. Oesophagus. D. Papilla. E. Chitinous Armature (Magnified 70 diameters).



Fig. 3.—HEAD OF FEMALE, showing papillae. (Magnified 70 diameters).

At its tail end, the male possesses a wide and well-marked copulatory bursa or caudal pouch. This structure is trilobed and supported and strengthened by rays or bands. There are also two well-marked copulatory spicules of equal length. Reference to fig 6 will show all these structures.

The ovarian tubes and uterus of the female are convoluted, but not markedly so. The latter opens into a vagina, which in turn opens on the external surface of the parasite as the vulva. The vulva is situated at the hind end of the body, only slightly anterior to the anus.

The eggs are ovoid; measured in the vagina of a preserved specimen those close up to the vulva were 64 to 72 μ long and 40 to 44.8 μ broad.

From the foregoing brief description it is evident that the parasite belongs to the family *Strongylidae*, to the sub-family *Strongylinae* (formerly termed *Sclerostominae*), and to the genus *Strongylus* (*Sclerostoma*). Certain

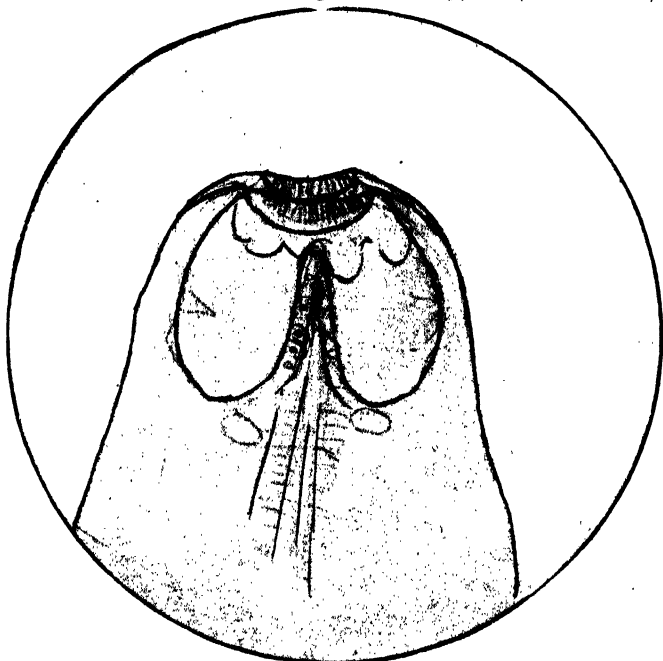


Fig. 4.—HEAD OF FEMALE. This preparation was rendered very transparent in order to show the longitudinal band supporting the buccal capsule.

members of this genus, such as the *Strongylus equinus* (*Sclerostomum equinum*) and the *Sclerostomum tetracanthum*, which occur in the intestines of horses, give rise at time to serious symptoms, and may even cause the death of their host.

Regarding the parasite now under consideration, if present in considerable numbers one would expect such worms to give rise to anæmia and diarrhœa. In the present instance, however, it would seem that the few *Strongyles* which were found in the intestine of the ostrich occasioned but little, if any, harmful effect—at any rate, the host prior to being killed was to all appearances in good health and in fairly good condition.

Our literature on the subject of ostrich diseases is still very scanty, and so far as the writer is aware the parasites above referred to have not been previously described.

For this reason, then, and in the hope that it may be of some slight interest to readers of the *Journal*, this brief note has been published.

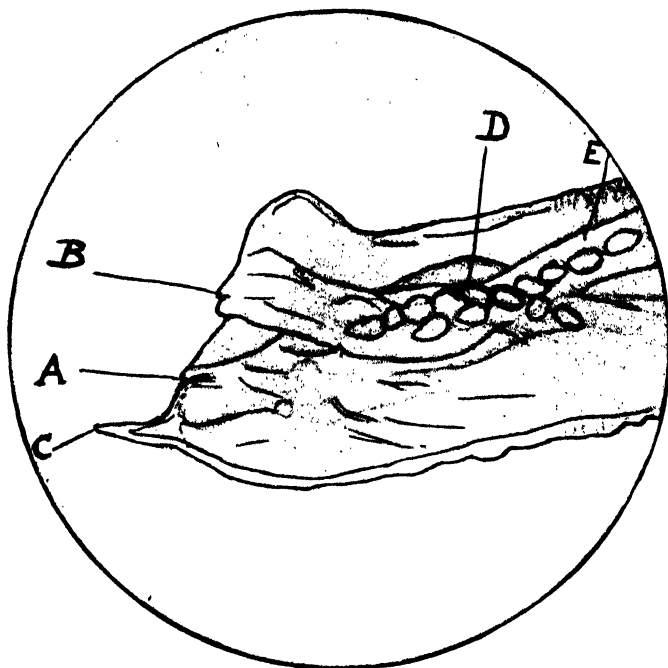


Fig. 5.—HIND END OF FEMALE. (Magnified 70 diameters). A. Anus. B. Vulva
C. Caudal extremity. D. Ovum in vagina. E. Uterus.

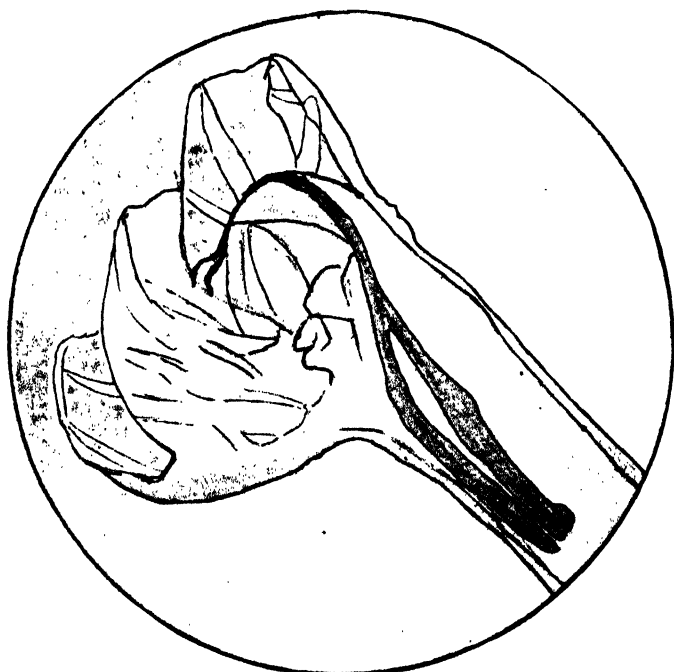


Fig. 6.—HIND END OF MALE.—Showing tri-lobed caudal bursa supported by rays.
The long copulatory spicules are also shown. (Magnified 70 diameters.)

ANIMAL DISEASES—CONTAGIOUS AND INFECTIOUS.

Summary of Outbreaks of Contagious and Infectious Animal Diseases Scheduled under Act No. 27 of 1893.

Still under Quarantine on 31st November, 1909.

DISTRICT.	Anthrax.	Epizootic Lymphangitis.	Glanders.	Lung sickness.	Redwater.	Scabies (Equines.)	Sponsziekte.	Tuberculosis.	Totals.
Albert	...	...	1	...	...	...	2	...	3
Barkly West	...	...	...	1	...	...	...	...	1
Calvinia	...	...	1	...	...	...	...	...	1
Cape	...	...	...	...	...	...	...	2	2
East London	...	1	...	4	...	3	...	...	8
Herschel	...	1	...	...	...	...	...	...	1
Humansdorp	...	1	...	...	...	6	...	...	7
Kimberley	...	1	...	...	...	...	...	...	1
King William's Town	...	...	...	8	...	3	...	...	11
Middledrift	...	1	...	...	...	...	...	...	1
Komgha	...	...	...	3	...	...	...	...	3
Kuruman	...	1	...	...	...	...	...	...	1
Mafeking	...	...	...	...	...	...	1	...	1
Peddie	...	...	...	2	...	...	...	...	2
<i>Tembuland.</i>									
Umtata	...	...	...	11	...	...	...	...	11
Engcobo	...	...	...	12	...	...	...	...	12
Xalanga	...	...	...	1	...	...	...	...	1
Elliot	...	...	...	...	...	...	1	...	1
St. Mark's	...	...	...	1	...	...	...	...	1
Mqanduli	...	...	...	4	...	...	5	...	9
Elliotdale	...	...	...	8	...	...	...	...	8
<i>Transkei.</i>									
Butterworth	...	...	...	6	...	...	4	...	10
Kentani	...	2	...	5	...	...	13	...	20
Nqamakwe	...	...	...	6	...	...	1	...	7
Tsomo	...	...	...	2	2	...	...	...	4
Idutywa	...	...	...	9	...	...	...	...	9
Willowvale	...	...	...	8	...	...	5	...	13
Port St. John's	...	...	...	1	...	...	...	...	1
<i>Pondoland.</i>									
Libode	...	...	...	3	...	...	...	...	3
Ngqeleni	...	...	...	3	...	...	1	...	4
Lusikisiki	...	...	...	4	...	...	1	...	5
Bizana	...	1	...	...	...	...	2	...	3
Tabankulu	...	...	...	12	...	1	...	...	13
<i>East Griqualand.</i>									
Umzimkulu	...	...	...	...	...	...	3	...	3
Qumbu	...	...	...	5	...	...	...	...	5
Tsolo	...	...	...	8	...	...	1	...	9
Mount Frere	...	...	...	3	...	...	...	...	3
Mount Fletcher	...	...	...	...	...	...	1	...	1
Totals	8	1	2	130	2	7	47	2	199

(Sgd.) J. D. BORTHWICK, Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon.
Cape Town. 23rd December, 1909.

THE FRESH FRUIT EXPORT TRADE.

REPORT OF THE TRADES COMMISSIONER FOR CAPE COLONY IN LONDON ON THE FRESH FRUIT EXPORT TRADE, FOR THE SEASON 1909.

Mr. C. du P. Chiappini, Trades Commissioner in London, forwards the following, under date October 29:---

I have the honour to report that during the past season I gave my earnest and unremitting attention to the export trade in Fresh Fruit from the Cape Colony.

Under the headings of the different varieties of fruit I deal in this Report with the results of the season under review, the prices obtained, the condition in which the fruit arrived, the quantities exported, and the quantities of each class of fruit which could be disposed of on these markets without seriously affecting the prices, the varieties, or classes, the qualities and sizes of fruit which are most desired, and those which are not wanted on these markets. I have also dealt fully with the questions of packing, grading and transportation of the different fruits, and I trust that growers and shippers will take serious note of these remarks and recommendations. I cannot too earnestly impress upon them the futility of shipping such varieties, qualities and sizes of fruit as the market does not want; they should exercise the utmost care in the packing, grading and selection of their fruit. It is essential that the requirements, the likes and prejudices of the buyers on these markets should be carefully studied, however peculiar they may appear to those who live under different conditions and in a different climate. It is also equally important that the peculiarities of the fruit itself should be carefully studied in so far as its capacity for keeping and travelling is concerned.

Fruit gathered in the heat of the day, or exposed unnecessarily to the heat after being gathered, or carelessly handled, or over-ripe when gathered, will not arrive in a saleable condition on this side. To disregard these points, or even to look upon them lightly, will mean certain loss to the actual shippers, and harm done to the name of Cape Fruit from which all exporters will suffer.

During the past season the fruit arrived in a better condition: there has been a marked improvement in the manner of packing, and new methods have been experimented with, some of which are likely to prove successful, and will probably improve the condition of the fruit on arrival. Unfortunately, however, the resources of the consignees and salesmen for the disposal of Cape Fruit were severely taxed; the unusual and almost unprecedented bad weather created a state of affairs with which they never before had to contend since the Cape Fruit trade was started. Besides continuous fogs and rains, the weather was bitterly cold; sometimes for four or five weeks the temperature seldom rose above freezing point, and almost throughout the Cape Fruit season greater portions of the United Kingdom and the Continent were covered with snow. Not only did people feel disinclined to eat fruit, but they were prevented from moving about and doing their shopping under such unfavourable conditions.

QUANTITIES EXPORTED.

The following figures show—in boxes—the total quantities of fruit exported from the Cape Colony for the seven years ending 1905:—

1899	10,817	1902	14,998
1900	17,336	1903	21,968
1901	17,265	1904	34,723
	1905	23,832	

and for purposes of closer comparison I append the quantities of each variety of fruit exported during the past four years:—

	1906.	1907.	1908.	1909.
Peaches	7,612	10,572	12,925	17,298
Pears	19,025	22,213	51,614	55,129
Plums	15,583	23,160	15,047	32,184
Nectarines	1,151	1,149	762	2,191
Grapes	15,491	23,291	77,367	32,323
Melons			1,494	216
Apricots	868	1,214	10,486	2,164
Apples	41	213	450	201
Pines	70	494	2,440	32,095
Sundries	25	49	153	121
	59,866	82,355	172,738	173,922

In reviewing these figures it is gratifying to notice a gradual increase in peaches and pears, and a substantial increase in plums and nectarines. There was a considerable decrease in 1909 in the quantity of grapes as compared with the previous year, and this is probably due to the unsatisfactory prices obtained during 1908. As prices obtained during the past season were again satisfactory, the quantities to be exported during the coming season will probably be considerable. I am not sorry to record a very considerable decrease in the quantity of apricots as compared with last year's exports, which were excessive, but I would welcome a gradual increase on the quantities during 1909. The enormous increase in the quantity of pines was rather embarrassing to those on this side who had to dispose of them; I deal, however, with this feature under the heading of "Pines." It is very desirable that increases in the export of each class of fruit should be gradual, but this can only come about when there is co-operation amongst shippers.

COST OF EXPORTING.

From actual experience and from other sources of information at my disposal, I have made estimates of the total costs of exporting different varieties of fruit, and I think these figures will be useful to those growers who had not yet had much experience in the export of fruit.

In submitting these figures I feel that I am laying myself open to criticism by experienced exporters, but I must explain that during the past three years I have kept accurate records and made many estimates,

and although my present figures are the outcome of previous estimates, they may not agree with the experience of many individual shippers, but they will probably prove to be a fair average of the result of the bulk of the shipments.

I have also added a column showing what I consider the *average* prices realised, for fairly sound and average quality fruit, during the past three years.

Wasty or rotten fruit realised little or no price, while very excellent fruit sometimes made fancy prices.

ESTIMATED COST OF PACKING, SHIPPING AND SELLING FRESH FRUIT FROM THE

CAPE COLONY ON THE LONDON MARKET.

	Cost of Boxes or Crates.	Cost of Labour in packing, &c.	Paper, Wood, Wool and Nails.	Railage and Dock charges.	Ocean Freight.	London Charges.	Total Cost.	Estimated Average Prices.
FRUIT SHIPPED IN COLD STORAGE.								
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Nectarines & Peaches, 20 to 24	0 3	0 3	0 2	0 1½	0 9½	0 8	2 3	17 6
Pears, 28 to 36	0 3½	0 3	0 2½	0 2½	1 1½	0 5	2 6	4 6
Plums, 24 to 36	0 3	0 2	0 2	0 1½	0 8½	0 5	1 10	4 9
Grapes, in 20lb. boxes	0 7½	0 4½	0 4	0 3	2 4	0 11	4 10	8 6
Grapes, in 10lb. boxes	0 4	0 2½	0 2	0 2	1 2	0 6½	2 7	4 7
Grapes, in 40lb. crates with baskets	2 7	1 0	0 3	0 8	4 0	2 0	10 6	20 0
Apricots, 28 to 36	0 2½	0 2	0 2	0 1	0 5	0 2½	1 3	5 0
Apples, per bushel	0 9	0 4	0 2½	0 3½	2 0	0 6	4 1	7 0
FRUIT SHIPPED IN VENTILATED HOLD.								
Oranges, per 100	0 10	0 3	0 3	0 5	0 11	0 7	3 3	6 3
Naartjes, 25 to 32	0 3	0 2	0 1½	0 2	0 3½	0 3	1 3	2 6
Pines (Queen's), 1 doz.	0 9	0 1½	0 2	0 3	0 8½	0 4	2 4	3 4
Almeria Grapes, 30 lbs.	0 9	0 3	0 6	0 4	1 3	0 8	3 9	8 9

FINANCIAL RESULT OF THE 1909 SEASON.

For the information of those interested in this trade, I have made the following estimates of the financial result of the fruit exported during the past season, calculated on the basis of the foregoing estimate of the "cost of shipping and average prices realised." These figures do not include oranges or other citrus fruit, nor fruit shipped from other South African Colonies.

Estimated total amount realised by Sales ...	£41,376
Estimated cost of boxes and packing material (all imported)	£4,996
Railway and Dock Charges	1,649
Ocean Freights	8,596
London and other market charges... ..	4,052
Estimated total outlay, not including labour in packing and cost of production... ..	19,293
Estimated net profit on sales	£22,083

From these figures it will be seen that shippers have to incur an outlay of nearly 50 per cent. of the return they may fairly hope for before they are in receipt of any remittances from their agents. It will also be seen that the ocean freights are estimated to amount to more than 20 per cent. of the total amount realised.

Although the figures showing the gross financial result of the past season are not imposing, and do not convey the idea that a large export trade worthy of the name has been created, I desire to point out that this trade is increasing as fast as is compatible with the requirements and expansions of the markets. The packing and the quality of the fruit exported are improving, and more economical and expeditious methods are being adopted in the matter of exportation. While it is profitable to ship the classes of fruit which make up almost the entire bulk of the fruit now exported from the Cape Colony, it must be remembered that these are high-class fruits, and as such will always only command a limited market, as they can be bought only by well-to-do people. They are, moreover, costly to handle and are more or less delicate and risky to trade in. Growers should therefore seriously commence to direct their attention to the fruits which can be shipped cheaply and in large quantities without greatly affecting the markets, and which will be consumed by the masses. I refer to such fruits as apples, Almeria grapes, and oranges, and to the list might also be added pears and pines, of which fairly large quantities are already coming forward. The two last-mentioned fruits cannot altogether properly be classed with cheap, popular fruits, but there is no reason why they should not become so.

I am dealing with apples and Almeria grapes fully in this report, and with oranges in a later and separate report. I must, however, impress upon growers of fruit the fact that if a large export trade is to be created, it will have to be with the aid of the fruits just mentioned. If the quantity of Almeria grapes or apples shipped to these markets during one season exceeded in each case the total quantity of all fruit at present exported from the Cape Colony, it would not affect market prices as much as the increased shipments of plums did during the past season.

DISTRIBUTION AND MARKETS.

The methods adopted by the consignees of Cape fruit for its distribution through the different markets of the United Kingdom and the Continent of Europe have much improved during the past year. The consignees have realised the importance of distributing the fruit sent to them in the widest manner possible.

Covent Garden is, of course, the greatest fruit market in England, though I am not sure that it deals with the largest bulk of fruit, but it is certainly the market specially suited for the distribution of the varieties of fruit exported from the Cape and dealt with in this report. It is the best market for high-class fruit and is attended by buyers from all parts of the United Kingdom.

Notwithstanding the advantages which Covent Garden affords, and the position it holds amongst the fruit markets of England, I consider it to be very desirable that certain classes of fruit which are intended for the Provincial and Continental markets should be forwarded direct from Southampton when carried by the mail steamers.

A few years ago I induced a firm of commission agents at Southampton to take up the distribution of fruit direct from that port. The results of their efforts have been quite successful and the prices returned by them compare most favourably with those of Covent Garden.

The advantages derived from this method of distribution are, that the fruit is forwarded to the different Provincial markets on Saturday morning, immediately after being landed, and arrives at its destination on Monday morning simultaneously with the bulk of the consignments at Covent Garden, thus not only saving time, but a considerable amount of handling also. I have found that fruit, and more particularly grapes, first forwarded to London and removed to the depots of the fruit agents there, and then purchased by the Provincial buyers, suffers a deal of damage by the extra amount of handling.

While expressing the firm belief that Covent Garden is the market for the large bulk of the Cape fruit, I consider it advantageous and cheaper to forward the fruit intended for other markets direct from Southampton.

The methods of distribution depend largely upon the shippers themselves, as they select the class of agent to whom they prefer to consign their fruit. Cape fruit is handled by three distinct classes of consignees, whom I will describe as follows:—

(a) *The General Agent*, who is probably a merchant or commission agent dealing in all classes of merchandise or produce. He is not in the fruit trade, but his functions are to place the fruit consigned to him in the hands of a fruit salesman or fruit auctioneer; to use his discretion as to the markets in which he considers it most advisable to place the fruit; and, if necessary, to hold back the fruit if he considers the market unfavourable. It is also his duty to keep a close watch on the salesman or auctioneer entrusted with the disposal of the fruit, and to endeavour to obtain the best prices possible for the shipper. In some cases these agents split up their consignments amongst a large number of fruit salesmen in different markets, and frequently change the salesmen if they are not satisfied with the prices. These agents are also liable for the proceeds, and take all responsibility for which of course they receive a commission which is arranged beforehand.

(b) *The Fruit Salesman* is in the fruit trade and deals in nothing else. He has stalls in Covent Garden and depots in the immediate neighbourhood. He is in direct touch with the fruit buyers and fruiterers and is the real means of distribution. Fair quantities of Cape fruit are shipped to these salesmen on consignment to be sold on commission. They claim to be in a better position than the fruit auctioneers to obtain high prices, as they have more time to sell the fruit, which they do by treaty and by bargaining. This method of selling is said to be particularly advantageous with high class fruit, and especially fruit which is not very well known on the markets.

(c) *The Fruit Auctioneers*.—These firms occupy stands in the Floral Hall of Covent Garden, where large quantities of fruit are sold three times a week by public auction. Samples of the brands are exposed on tables previous to the sale, and while the sale is proceeding two boxes of each brand are opened in the presence of the large audience of buyers and bidding is immediately started. Though there are some drawbacks to this method of selling, yet it has considerable advantages. The fruit thus sold is immediately taken off the market and disposed of by the retailers. The fruit auctioneers contend that they make better prices than other salesmen, and in some cases I have found them to be correct in this statement.

It is also feasible for shippers to consign their fruit direct to the auctioneers should they consider it advisable to do so. I consider the public auction method of selling to be advantageous when large quantities of fruit are coming forward.

But as to the best manner of disposing of the fruit on these markets, I would advise shippers to select a good agent with some experience in the Cape fruit trade, and leave it to his judgment as to its disposal. A great

rivalry has been created amongst the consignees of Cape fruit, each of whom is doing his best to satisfy his patrons, and on the whole I think everything possible is being done by these gentlemen on behalf of the shippers to obtain the best results.

The development and exploitation of Provincial and Continental markets is a question which has received my close attention.

I have been in constant communication with the principal dealers in the large provincial towns in the United Kingdom, and have endeavoured to place them in direct communication with the consignees in London and at Southampton who have large quantities of fruit for distribution.

In regard to the Continental markets I may mention that I visited Hamburg and found that this port could be gradually developed as a market for the different varieties of Cape fruits. The large towns in Germany are mostly supplied through Hamburg.

Rotterdam and Amsterdam are also taking small quantities of Cape fruit, and there is every reason to believe that these markets will also gradually develop.

The market in Paris for Cape fruit has always been a difficult question, but I think it will, in time, also develop.

I have recently been in communication with the principal fruit dealers at Copenhagen and Stockholm, with a view of opening up markets for Cape fruit, and I am led to believe that small quantities will find their way there during the forthcoming season.

With reference to Continental markets generally, it must be borne in mind that Cape fruit is quite new to them, and that such classes of fruit which arrive during the winter months are a novelty and will, at the outset, only meet with a limited demand.

I should also like to point out that there are at present considerable difficulties in transporting the fruit to the Continental markets, upon arrival at English ports. Different consignees have adopted different methods, but none of these methods are quite satisfactory. The quickest route which has now been found for despatching consignments intended for the markets of Northern Europe is to ship *via* Grimsby to Hamburg. For this purpose the fruit should be put on rail at Southampton, on Saturday morning, and forwarded direct to Grimsby by the South Western and Great Eastern Railways. The first available boat sails from Grimsby on the following Monday evening. The fruit could thus be placed on the Hamburg market on Wednesday. By the other routes which have hitherto been made use of, the fruit arrived at Hamburg on Friday and could not be marketed until Saturday morning, which is not a good market day. These are questions, however, which would be best left in the hands of the consignees, with whom I am in constant communication upon the subject.

As to the question of developing a market for Cape fruit in New York, the same remarks would apply as to other new markets. I think a market could be developed there, but it must be done gradually, while studying the tastes of the people, and gradually making them accustomed to these classes of fruit during the winter months.

GOVERNMENT BRAND.

During the past season I have again carefully noted the effect of the Government brand on these markets, and I regret to have to repeat that little notice was taken of it by fruit dealers. This is much to be regretted, as it would undoubtedly be of great advantage to those shippers who pack first-class fruit if the brand was recognised in the trade. The fact, however, remains that after the brand has been placed on the box certain classes of fruit deteriorate in different degrees, and the fruit is judged on this side solely by its condition on arrival. I think, however, the branding of the fruit has had a good effect upon the general quality of the fruit

shipped as the Government inspection would act to a certain degree as a check on those shippers who, through lack of knowledge, contemplate the shipment of fruit which would be unsuitable for this market. The Inspector is also in the position to see that the boxes are properly marked, and generally to advise shippers upon any mistakes which might have been made by their employees unknown to them.

If I were a shipper of fruit, and satisfied that the Government Inspector was thoroughly conversant with the latest requirements of the London market, I would give him full authority to reject any portion of my fruit intended for shipment, if he considered it unfit for export, in which case it could be sold for what it would fetch on the Cape Town market. There is not the slightest use in paying freight on fruit which could not stand the journey, or which is of such quality or variety as to make it unsaleable on these markets.

ADVERTISING CAPE FRUIT.

I notice that this question has been raised recently on more than one occasion, and in connection therewith I would like to state that I consider it highly desirable that some steps should be taken to make Cape fruit better known on the markets of the United Kingdom, as well as those of the Continent. The fact that the fruit is not well known even to the fruiterers considerably restricts the demand.

It has been suggested to me that an attractive coloured bill poster, illustrating Cape fruit, should be prominently exhibited at all towns where Cape fruit is sold, and I think if this could be done it would certainly benefit the trade.

The question is, however, who is to pay for such advertising, and upon this point I prefer to make no suggestion.

Another method of popularising the fruit is by taking advantage during the season of the Horticultural Shows held at different parts in England. If shippers were to instruct their agents to make use of these Shows and to exhibit samples of their consignments (which might be packed specially for this purpose), they would, in addition to the probability of their winning prizes, be greatly benefiting the trade and have the satisfaction of knowing that they are doing so by the method of self-help.

During March, 1908, the Royal Horticultural Society very kindly allotted a day specially for South African fruit, and offered several valuable prizes. They placed their hall and all their attendants at my disposal free of charge. Although I gave ample notice of this generous offer to the fruit-growers in the Cape Colony through your Department, the result was most disappointing, for only two shippers took advantage of the Show, and I would have been left entirely in the lurch had it not been for some of the agents of the growers who, at my special request, came to my assistance and put up some very creditable exhibits. In spite of this I had, however, to purchase a quantity of Cape fruit at my own expense so as to make a fairly representative show.

OCEAN FREIGHTS.

The present freight rates charged by the Conference Lines of Steamers for the cold storage in their ships are:—

For Peaches	65s.
„ Pears and Plums	60s.
„ Grapes and sundry Fruits	55s.
„ Pines, Oranges and other Fruits shipped in the ventilated hold	25s.

All plus 10 per cent. primage and at per ton measurement of 40 cubic feet.

The fruit shippers have, through your Department, preferred a request that representations, with a view to certain modifications to those charges, might be made to the Shipping Companies. With this object, the Agent-General and I have made ourselves thoroughly acquainted with the statistics and other details of this subject in all its bearings, so as to enable us to carry on these negotiations which have been of a prolonged nature and one not yet concluded.

I am, therefore, prevented from dealing fully with the subject at the present time.

The question of additional accommodation in the ships has also been much discussed. This is, however, a very difficult question and entirely rests with the Shipping Companies, but I can assure exporters that if the Shipping Companies are satisfied that the fruit export trade will expand, and that the rates of freights are remunerative to them, they will in their own interests increase the cold storage accommodation in the ships and probably provide additional accommodation in new ships.

The advisability of shipping fruit in the intermediate steamers has engaged my serious attention during the last three years, and I am forced to the conclusion that as matters now stand the position is far from being satisfactory.

I understand that it has been customary for shippers to pack their fruit with a view to shipment by a certain mail steamer, but that if their fruit did not find space in the mail steamer it was kept over and shipped by the following intermediate boat sailing on Tuesday, ten days after the fruit was packed. These intermediate boats usually arrive in the East India Docks, London, on Thursday night and commence discharging cargo early on Friday morning, twenty-four days after the date of sailing from Table Bay, and experience has shown me that, notwithstanding every effort made to get the fruit to Covent Garden before the sales closed, in most cases it had to be held over until the following Monday, as Saturday is no sale day. The consequence is that fruit consigned per the intermediate boat clashed with the fruit which arrived by the mail, which sailed from Table Bay fourteen days later than the mail steamer in which it was originally intended the consignment should be shipped.

This method of shipping has proved disastrous to the export of Grapes, and has been the cause of the bad condition and part failure of large quantities of grapes which were shipped under the Government Experimental Scheme during 1908, a failure for which, most unjustly, the scheme was generally blamed.

In addition to this, there is the question of cost. Fruit which arrives by the mail steamer is carried to Nine Elms Station without any additional charge, whereas if it is landed at East India Docks it is liable to wharfage and landing charges, for which a special tariff has been granted for Cape fruit as follows:—

	14 lbs.	21 lbs.	28 lbs.
Single Case	1½d.	2½d.	3d.
2 Battened together	2d.	3d.	4d.
3 Battened together	3d.	4d.	4½d.

I have made an estimate of the additional charge per ton above the freight already paid on fruit landed at the East India Docks, and by

adding the additional cartage chargeable have arrived at the following figures:—

Peaches and Nectarines, about 12s. per ton of 40 cubic feet.

Pears, Plums, and Apricots, about 13s. 3d. per ton of 40 cubic feet.

Grapes and Apples, about 7s. 3d. per ton of 40 cubic feet.

Oranges and Pineapples, about 7s. to 8s. per ton of 40 cubic feet.

The prices, of course, vary according to the size of the boxes and the number which go to a ton, and also depend on whether they are battened together or not.

I cannot say anything more about this subject at present, except that strong representations, which form part of the negotiations now pending, have been made to the Shipping Companies.

I would, however, suggest that if the Shipping Companies can be induced to make a reasonable reduction in the cold storage charges by the intermediate steamers, exporters should take advantage of the space in these ships to ship their apricots, plums, nectarines, and pears, as these fruit travel well, thus creating more available space in the mail boats. I hesitate to suggest that shippers should consign their peaches by the intermediate steamers, as they are not very satisfactory travellers, and I certainly do not recommend any exporter to ship grapes by the slow boats. It is quite out of the question to expect the existing variety of grapes to keep for such a long period. If we succeed in transporting grapes in a satisfactory condition by the mail steamers it will be more than has been accomplished by any other country equally distant from England.

The transportation of grapes in the intermediate steamers has been the source of the greatest loss to the shippers in the past. It must, however, be pointed out that as the Union-Castle Company have, at considerable cost, fitted up their intermediate steamers with cold storage accommodation, it is expected that shippers will take advantage of the space thus afforded, particularly as the accommodation in the mail steamers is found to be inadequate during the busy part of the season.

Fruit, which is intended to be shipped by the intermediate steamers, should be gathered and packed intentionally for this purpose, that is to say, shippers should not try to ship by the mail steamer, and then, if their fruit is shut out, to keep it over for six days waiting for the intermediate boat. It would be better under those circumstances to try and find space in the following mail boat, as the fruit would then arrive on this market a week earlier than if shipped by the intermediate boat.

The best advice I can offer to those shippers who are not well acquainted with the circumstances is to engage space in the mail or in the intermediate steamers before they gather their fruit, and only pack fruit for export if they are sure of finding space for it in the selected ships. It is absurd to repeat the mistakes of the 1908 season, when fruit was kept for fourteen days in the Docks at Cape Town, and then eventually shipped by the intermediate steamers. Such short-sighted action has been the cause of much trouble and loss to exporters.

While dealing with the question of transportation of fruit, I wish to say that on frequent occasions I visited Southampton, and the East India Docks, while the fruit was being discharged, and on every occasion I found that every care was being exercised, and that both officers and servants of the Union-Castle Company and the South-Western Railway Company, as well as the Docks officials, always gave their closest care and attention to the careful and expeditious handling of the Cape fruit consignments.

ENGLISH RAILWAY FREIGHTS.

With reference to the classification of freight by the Railway Companies in the United Kingdom, I find that in fixing their tariff, regard is given to the value and quantity of the fruit carried. For instance:—

Pears and Apples are placed	Under Class 1. (the lowest rate).
Oranges, Lemons, and Plums	„ Class 2.
Apricots, Nectarines, and Peaches	„ Class 3.
Grapes, packed in corkdust or sawdust	„ Class 3.
Pines (not hothouse)... ..	„ Class 4.
Pines and other hothouse fruit... ..	„ Class 5.
Grapes, in any other package... ..	„ Class 5.

It will therefore be seen that Cape grapes would, according to this tariff, be subject to the rates in Class 5, which are the highest, and that Cape pines would come under Class 4.

To give some idea of the differences in the charges I will give as a sample the rates on the London and South Western Railway between Southampton and Ilfracombe:—

Class 1	per ton	30s. 3d.
„ 2	„ „	37s.
„ 3	„ „	44s. 7d.
„ 4	„ „	54s.
„ 5	„ „	64s. 7d.

It will thus be seen that if Cape grapes and pines have to remain under their present Class, the railway freights for long distances, such as to Edinburgh and Glasgow, would be almost prohibitive. I therefore approached different Railway Companies, and have explained to them that both Cape grapes and Cape pines should be regarded as cheaper classes of freight, as compared with those grown in hothouses, and that they are being imported from the Cape in large quantities, and I have asked that they should be placed under Class 3.

The negotiations have been of a prolonged nature, and are now being carried on between myself and the Railway Classification Committee. I have not yet received a final reply, but in an interview I had with a representative of this Committee I am led to believe that my request will be granted. There are at present small difficulties still in the way, which I hope will disappear before the forthcoming fruit season.

I will now deal with each particular fruit separately:—

APRICOTS.

During the past season 2,164 boxes of apricots were shipped, as against 10,486 cases the previous year. The season for apricots is very short, the first shipment arrived about the first week in January, and consignments continued to be received until the first week in February. The large shipments of the 1908 season were a great mistake, as the prices indicated. By far the greater portion was shipped as a speculation by one shipper who had no knowledge of the requirements of the London market. In a previous report I recommended "caution and moderation" in the shipment of apricots; I also pointed out that in England apricots are not generally regarded as a first-class dessert fruit, but are chiefly used for cooking, although there is a limited demand for large and well-coloured fruit for dessert purposes. I think the market will now take about 600 to 700 cases per week, and will gradually expand.

During the 1909 season the fruit generally arrived in very good condition, the quality and appearance were much better, and there was a considerable improvement in the packing. I noticed, however, a few shipments which were not carefully graded as to size; in other instances too much wood wool had been used in the packing, while a few small lots arrived in a wasty condition.

The prices made during the season were very satisfactory. They commenced with about 6s. to 8s. 6d. per box of 30 to 36, and 2s. to 2s. 6d. for 15 to 20 counts. These prices were maintained to the end of the season, and may be considered the average prices for the season; in a few instances for extra fine fruit 8s. 6d. to 10s. and even 12s. was paid for a box of 36.

The system generally adopted has been to pack the fruit in trays holding 30 to 60, and I do not think there has been any objection to it in the trade here. During the past season, however, one of the largest shippers of apricots adopted the French system, by packing 15 to 20 fruit in small boxes $11\frac{1}{4}$ " x $8\frac{1}{2}$ ", with little or no wood wool. These small boxes were shipped in crates; this was a very neat package and the prices made were satisfactory.

Apricots must be packed tightly with as little wood wool as possible; each fruit must be wrapped in a suitable piece of paper, and if trays are used they should be battened together in sets of three or four.

Particular attention should be paid to the grading of the fruit according to size, and only large, well-developed fruit with good colour should be shipped.

PEACHES.

During the past season 17,298 boxes of peaches were shipped, as compared with 12,925 boxes the previous year. The quantity was not in excess of what the market can take, although there is every reason to believe that any sudden and considerable increase in the shipments would have the effect of bringing down prices.

The first shipment arrived about the first week in January, and consignments continued to be received up to about the end of March.

The prices obtained during the season (considering the very bad condition of the fruit market generally) were very satisfactory. The first shipments during January made 12s. to 20s. per box when sound and of good size and colour, some specially good marks making up to 30s. per box of 15 to 18 and 20-24 counts. When the larger shipments arrived during the latter part of January and during February, the prices for the first quality came down to 8s. to 16s., 6s. to 12s., and 5s. to 9s., while the "Clingstone" yellow and colourless varieties were making 2s. 9d. to 4s. 6d. per box.

During the last few weeks of the season, in consequence of the bad condition of the fruit on arrival, the prices fell to about 5s. to 8s. for the first quality and 1s. 9d. to 3s. for the inferior grades.

The average prices for peaches of good size and colour may be taken to be 7s. 6d. to 10s. 6d. per box of 15-20 and 20-24, whereas the prices for yellow, colourless, and Clingstone varieties probably averaged 3s. to 4s. 6d. per box of similar counts as above.

During the past season the peaches arrived in rather a better condition than the previous year. During the latter part of the season, however, several shipments proved to be affected by maggots a few days after landing. This caused uneasiness amongst the buyers, as the outward appearance of the fruit was good, consequently the sound as well as the affected fruit suffered. I call the attention of the growers to this with the hope that they may find a remedy for this evil.

The grading was not always satisfactory, although there has been a general improvement. One or two new shippers showed an entire want of knowledge of the requirements of the London market by shipping absolute rubbish in the shape of small immature green peaches with long points.

Several shipments of Yellow Flesh, Colourless, and Clingstone peaches were again received this season, but it is not necessary to specify them by name. It is sufficient to say that the English market does not want them, as the prices before quoted will indicate. This is unfortunate, as some of our growers, I am afraid, planted large quantities of these varieties and, although they are not popular here, there is no doubt that the flavour of some of the yellow peaches is excellent. This makes it difficult for the growers in the Cape Colony to understand why the English market will not buy them, but let me give one of my experiences in connection with this particular subject.

One morning I walked into the stand of one of the leading commission salesmen at Covent Garden; after greeting him and inquiring how he was getting on with the Cape fruit, he said to me, pointing with his foot to a pile of boxes containing "Yellow Peaches": "Look at that rubbish." Pretending not to know what he meant, I said: "What's the matter with them?" Instead of answering me, he asked me: "Will you buy them?" "No," said I, "but I would like to eat them; they are of excellent flavour." "That may be," he replied, "but I don't want to eat them, and I can't sell them." He added that he had had them there for weeks.

It is not much use for me to specify the varieties by name which the London market will take, as peaches, unlike other fruit, are not much known in the market by their names, but rather by their appearance and quality.

The market requires a fairly large peach, with white flesh, round in shape, and with as much colour as possible; it must not have a point, and must be juicy. Colour without size will not avail. Size and colour must be combined in a perfectly saleable article.

Packing.—The packing during the past season was as usual good. Some shippers, however, packed in boxes which were too frail, which caused them some loss, as these boxes could not stand the journey. Some complaints were also made about the coarseness of the wood wool used by some packers.

A few packers again tried the French method of packing in cotton wool, but this did not prove altogether successful, the fruit thus packed not having arrived in good condition. Experience shows that cotton wool packing is not suitable for a long journey. It is too dense and does not allow the cold air to get to the fruit soon enough to retard the process of ripening. The best method of packing is that which has for a long time been adopted by the Cape packers: that is in trays holding from 16 to 24 fruit, strong enough to carry the fruit; each peach to be wrapped in suitable paper and packed in soft white wool of the best and finest quality. To save market dues and to facilitate handling three trays should be battened together.

Grading.—The Government's official grades should be carefully followed. Only fruit of uniform size, shape, ripeness, quality, and colour should be packed in each tray. Each tray should be fully filled with the fruit; complaints this season included instances where one or two fruits less than the number indicated were included, and where fruits differing over an inch in diameter were included in the same box, and where only 18 were packed of a size, of which 24 could have been sent in the same box, the rest of the box being filled with wood wool. The fruit in every box of the similar grade and mark should be identical.

NECTARINES.

The shipments of nectarines during the past season amounted to 2,191 boxes, as against 762 for the previous year. This increase was very welcome, though the demand on the London Market is not nearly so great as for peaches. The more colour the better it is appreciated. There is no objection to the yellow-flesh nectarines; these are known as the Golden Nectarine, and are rather sought after. I hope the gradual increase in the number of shipments will continue.

The first consignments arrived during the latter part of January, and shipments were received until about the middle of March. The early arrivals made about 10s. to 20s. per boxes of about 20 to 26; afterwards they were being sold at 8s. to 16s., sometimes up to 20s. per box. The prices were well maintained up to the end of the season. The average prices for the season would be from about 7s. to 13s. per box.

The fruit generally arrived in good condition, and a bad box of nectarines is rarely seen on the market.

Packers must, however, be very careful about the grading. All fruit in each box must be uniform in size and colour; they could be packed in trays or boxes of 24 to 28, wrapped in paper, and a little wood wool should be used, but it must be of the finest and best quality; three trays should be battened together.

PLUMS.

The total shipment of plums for the past season amounted to 32,184, as again 15,047 for the previous year. This large increase was not too much for the market to take. The favourite varieties were much sought after and made good prices. The markets are widening and the demand is increasing for this fruit.

The first shipment arrived during the third week in January, and the last shipments at the end of April.

The prices at the commencement of February were: "Burbanks," 3s. to 4s.; "Wicksons," 4s. to 7s.; "Satsumas," 8s. to 10s. The following week "Burbanks" were making 1s. 6d. to 2s.; "Wicksons," 2s. 3d. to 4s. 6d.; "Satsumas," 6s. to 10s.; "Apple Plums," 7s. to 10s.

At the commencement of March "Wicksons" were 3s. to 4s. 6d.; "Kelseys," 5s. to 8s.; "Apple Plums," 7s. to 8s. 6d.; "Satsumas," 5s. 6d. to 6s. 6d.; Chalcott's, 4s. 6d. to 5s. 6d.

During the latter part of the season the shipments were comprised almost entirely of "Kelsey" and "Apple Plums," which were being sold at 5s. to 7s. and 8s. to 11s. per box respectively.

The average prices for the past season for the different varieties may fairly be stated as follows:—

"Apple Plums," 7s. to 10s.; "Satsumas," 6s. to 8s.; "Kelseys," 5s. to 7s.; "Chalcots," 4s. 6d. to 5s. 6d.; "Wicksons," 3s. 3d. to 4s. 6d.; "Burbanks," 2s. to 3s. These prices were for sound and fairly sound fruit. It is impossible to record the prices of wasty and over-ripe fruit.

It will be seen from the above figures that the two dark flesh varieties—"Apple Plums" and "Satsumas"—are easily first; they are much liked both for their flavour and attractive appearance, but it must be borne in mind that the quantities of shipments of these varieties were very small compared with the others. If large shipments of these were to come forward, the prices would fall to some extent. I am glad, however, to record that the quantities of the "Satsuma" shipments have increased.

The next favourites are the "Kelsey"; they are always a good plum for this market; they travel well, have a bright and attractive colour, and are of good size and flavour. "Wicksons" are also fairly attractive

in colour, and of good size, but of very poor flavour, besides which they usually arrive out of condition, either too green, or else over-ripe. When sound, they are deceptive to the consumers. Whenever I hear anybody complaining about having bought Cape plums and found them to be of unpleasant flavour, I know they have had "Wicksons."

As to "Burbanks," I can only repeat what has frequently been said by myself and by the agents of the growers on this side, viz.: that they are not suitable for this market. They are not liked and, moreover, spoil the good name of Cape plums, besides which they frequently arrive in a bad condition. I feel sure that the shipments of the past season did not pay for the freight and packing.

The following other varieties were also included in the shipments:—"Chalcots," "Ogan," "Shiro Simoni," "Sultans," and "Jeffersons," but I am not in a position to express an opinion upon these. I would merely say that growers should satisfy themselves as to which are the two or three most suitable varieties for the market, and if they can grow these successfully on their farms, to confine themselves to them.

The packing of plums is more simple than that of other fruit; they should be tightly packed with as little wood wool as possible, wrapped in fancy paper, well graded, and in counts of from 24 to 36. Three boxes should be battened together.

PEARS.

The quantity of pears shipped during the past season shows a good increase over that of previous season, 55,129 boxes against 51,614 for 1908, while the shipments for 1907 amounted to 22,213.

There is a good demand for pears on these markets at medium and low prices. They are a fruit well-known to the British public, but consumers will not pay a fancy price for them, excepting for very small quantities. The quality of Cape pears is very much appreciated, it is easily superior to similar fruit from other Colonies.

Pears enjoy a long season compared with other Cape fruit; the first shipments arrived during the last week in January and consignments continued to be received up to the middle of March.

The first shipments made from 6s. to 8s. per box of 20 to 24. During the middle of February "Bon Chretien" pears were selling at 5s. to 6s.; "Clapps' Favourites" fetched 4s. to 5s.; and other varieties about similar prices. At the end of that month "Bon Chretiens" were making 3s. 6d. to 5s. 6d.; "Clapps' Favourites" and "Beurre Bosc," 3s. to 4s. 6d., while the same varieties packed in large boxes, i.e., counts of 80, 72 and 54, made 6s. 9d., 7s. 6d., and 10s., the smaller counts making relatively higher prices.

During the first week in March the following prices were made:—"Bon Chretien," 3s. 6d. to 5s.; "Beurre Hardy," 2s. 9d. to 3s. 6d.; "Louise Bonne," 4s. to 5s. in counts of 20-32; while pears in boxes of 80, 72 and 54 were making 5s., 6s., and 8s.

During the second week of March a very large shipment of 13,000 boxes arrived, and these made from 2s. 3d. to 4s. for the ordinary size boxes, while the large boxes were making 5s. to 6s. On the 13th March another large shipment arrived, in addition to which the intermediate ship brought a considerable consignment, the total for the two ships exceeding 15,000 cases. Unfortunately, also the weather was exceedingly unfavourable and, in consequence, the resources of the consignees and salesmen were severely taxed. Prices were, however, maintained at the level of the previous week.

During the week ending the 2nd April the following prices were recorded:—"Bon Chretien," 4s. to 6s.; "Beurre Bosc," 4s. to 6s.; "Beurre Hardy," 3s. 6d. to 5s.; "Louise Bonne," 4s. 3d. to 5s. 6d.; "Winter

Nelis," 4s. 6d. to 5s. 6d., for counts of 20 to 32. Large boxes making 6s. to 7s. Up to the middle of April the prices for these varieties were from 3s. 3d. to 6s. From the latter portion of April to the close of the season prices were considerably better, "Beurre Bosc" making 6s. to 9s.; "Winter Nelis," 6s. 6d. to 8s.; and "Glou Morceau," 6s. 6d. to 7s. 3d., for counts of 20 to 32.

During the first part of the season practically all consignments arrived in a very good condition, but later on a "wasty" condition was observable in a considerable proportion of the arrivals, particularly amongst the "Bon Chretien," and this variety comprised the larger share of the total shipments. "Bon Chretiens" are a very popular pear on these markets, but they are very bad travellers, as they ripen so quickly. The general mistake is to pack the fruit too ripe, and it requires the greatest skill and experience to know exactly when to gather it for packing. Only expert packers should be employed in packing this variety of pear.

The other varieties, though not quite so popular, made fair prices and generally arrived in a good condition, particularly "Louis Bonne," "Beurre Bosc," "Winter Nelis" and "Glou Morceau."

During the season 1908 I wrote to ten leading fruit salesmen in Covent Garden and the Provinces, asking them to give me the names of ten varieties of pears which they thought they could sell best; excepting as to "Bon Chretien," their verdict was by no means unanimous.

I give the list of 12 varieties in accordance with the greatest number of recommendations:—

William Bon Chretien.	Glou Morceau.
Doyenne de Comice.	Duchesse D'Angoulême.
Louise Bonne.	Beurre Clargeau.
Beurre Bosc.	Souvenir Du Congres.
Winter Nelis.	Easter Beurre.
Beurre Hardy.	Clapps' Favourite.

The method of packing pears is well understood by Cape packers, the small counts 20 to 32 may be a little more costly, but they seem to make better prices than the large counts of 54 to 80. It is, however, desirable that the greatest number of pears be packed in a box in the most economical manner for shipment to make the trade profitable, and they will have to be sold at low prices so as to enable the market to take large quantities.

During the past season some of the shipments arrived in very bad condition, the fruit being almost entirely rotten. It was subsequently found that these consignments had been cold stored in Cape Town for some time before shipment with a view to regulating the quantities. I must ask shippers not to follow a similar course in future. If there is room in the ship the fruit should be shipped immediately it is ready for despatch, even if it has to be sent by one of the intermediate steamers. It must be left to the consignees or agents on this side to decide upon arrival of the fruit whether it can stand further cold storage, and the agents will decide how to regulate the quantities to be put on the market.

British Columbian growers have sent over hardy varieties of pears in boxes measuring 20 x 15 x 10 inches, holding about 40 lbs. each. Each fruit was wrapped in a piece of paper; the sides, top and bottom of the boxes were slightly protected by wood wool and paper, and all the fruits arrived in an excellent condition after a journey of between two and three weeks. I mention this in case some Cape shippers may like to experiment in exporting pears packed in this method in anticipation of the expansion of the market here.

GRAPES.

The total shipments of grapes during the past season amount to 32,323 boxes, against 77,367 the previous year. Cape grapes must be looked upon as a fairly high-priced fruit and, as such, the demand is necessarily somewhat limited. The demand will, however, gradually increase when it is more widely known that this fruit can be obtained in the European markets during the winter months, and I see no reason, provided the grapes arrive in good and sound condition, why these markets should not take 80,000 boxes of grapes during the forthcoming season. The reason why the grapes made bad prices during the 1908 season was not because the shipments were excessive, but because they arrived in a bad condition. (I am dealing with the cause of the bad condition in another part of this report.)

During 1909 season a marked improvement in this respect was noticeable. The first consignments commenced to arrive during the last week in February, and shipments continued up to the middle of May.

Prices.—The first shipment of "Hermitage" made 3s. 6d. to 5s. for 10 lbs., but they were of poor quality. During the following week the same variety made 6s. to 6s. 6d. per 10 lbs., the grapes being of better quality and in sound condition.

During the week ending March 19th, the following prices were recorded for sound grapes:—Hermitage, 5s. 6d. to 6s. 6d.; White Hanepoot, 5s. to 7s.; Red Hanepoot, 6s. 6d. to 8s.; Raisin Blanc, 5s. to 6s. The prices continued at about this level up to the first week in April, when the amounts obtained for red and black grapes showed considerable increase, viz.:—Red Hanepoot, 8s. to 9s. 6d.; Barbarossa, 7s. to 8s.; Hermitage, 6s. 6d. to 8s. 6d.; White Hanepoot, 4s. 6d. to 5s. 6d.; Raisin Blanc, 3s. 6d. to 4s. Babarossa packed in 6 lb. baskets 4s. 9d., and Raisin Blanc, 3s. 6d. Hermitage packed in 6 lb. boxes with no wood wool, sound, 3s. 3d. to 3s. 9d. During the following weeks the consignments received were rather wasty and prices fell in consequence. April 30th: Raisin Blanc, 4s. 6d. to 5s. 9d., 10 lbs., and in 6 lb. baskets, 4s. 9d.; Red Hanepoot, 4s. to 5s. 6d.; White Hanepoot, 2s. 6d. to 3s. The prices for the last shipments of the season were: White Hanepoot, 2s. 6d. to 5s. 6d.; Red Hanepoot, 4s. to 5s. 6d.; Hermitage, 3s. to 5s., all rather wasty.

I kept a fairly comprehensive record of the prices for each week throughout the season, and on averaging those obtained for each variety, the result is as follows:—

Red Hanepoot, 7s.; Barbarossa, 6s. 9d.; Hermitage, 5s. 6d.; Raisin Blanc, 5s.; and White Hanepoot, 4s. 9d. All the above prices, unless otherwise stated, are for 10 lb. boxes; and for grapes which arrived sound or fairly sound the prices for 20 lb. boxes were very nearly double the above.

The foregoing results will show that Red Hanepoot is the most profitable grape to ship, and that black grapes make better prices than white. White Hanepoot is not sufficiently attractive for the English market; the buyers are extremely critical and they notice the small marks and blemishes on the berries, which do not show up on the red variety.

In my last report I urged shippers not to ship the Black Prince and French grape, as the berries of these varieties are much too small for this market. A few growers evidently did not read my report, or if they did, disregarded my advice, to their cost: a few shipments came forward and were quite unsaleable. A Covent Garden salesman, who had them for disposal, said to me that they were more like currants than grapes and that he could not sell them.

I saw a small shipment of the "Lady Down Seedling" arrive. They are dark grapes with large berries growing loosely on the bunch, and are

just the kind of grape which this market requires. They approach the Belgian hot-house grape in appearance, but are of better flavour. If growers were to grow these on trellises, thin them out and ship them in chip baskets in crates they would make big prices.

The class of grape which is desired on this market can be described as follows:—Large berries hanging free and loosely on the bunch, red and black preferred. The bunches must not be tightly grown, nor be of a scraggy appearance, but must have a good shape. The grapes must arrive fresh, if possible with the bloom; the bunches must not be fingered unnecessarily, but handled only by the stalk. It is absolutely necessary that the packers be supplied with grape (thinning out) scissors with which to trim the bunches and pick out all the over-ripe, immature or damaged berries.

I think it necessary to quote the following paragraph out of my previous report on grapes, as follows:—

“One of the most important lessons which has been learned in connection with the export of Cape grapes, is that the grapes which have been brought from shady places or on damp soil have proved quite unsuitable for transport, whereas those grown on dry sunny parts on higher land and well drained soil, though the berries are much smaller, have always travelled well. I must ask the growers to give this matter their serious consideration. I have seen large shipments of the most beautiful grapes which I know to have been grown in shady and moist situations, arrive here in an absolutely wasty condition, which has caused considerable loss to the shippers.”

Growers should test the capabilities of their vineyards for producing grapes suitable for export, by taking advantage of the cold storage experiment scheme which is contemplated by the Government, and which is referred to under another heading in this report.

I must once again urge upon growers to try the experiment of thinning out their grapes when the berries are about half developed. I know that it is very troublesome to thin out grapes which are grown so low on the ground as the Cape grapes are usually grown, but this is hardly a sufficient excuse for not doing it at all. Will a few growers oblige me by trying a small quantity, and when they ship them, mark the boxes and advise me? I will then get special reports from dealers and see the results. I think growers should also consider the advisability of growing grapes for export on trellises with sides and tops, so as to shade the grapes from the sun, and keep them clear from the ground, and further from the dust; it will also be more convenient for thinning out; it will pay them well if they get 6d. to 9d. a lb. for their grapes.

Packing.—Grapes are the most difficult of all Cape fruit to convey to these markets. It is not generally known that the Cape is the only country which has succeeded in shipping grapes in cold storage for such a long distance. Australia has attempted it for double the distance, but has not yet got out of the experimental stage. Because it is such a delicate fruit it requires the greatest care in packing; it is very necessary that this matter should be carefully studied, so as to overcome the difficulties of transportation, for it is of the greatest importance to the Colony that a successful and extensive grape export trade should be developed.

The class of grape which is exported from the Cape is considered a good class of table grape, but to maintain this position it must look well when it arrives. It is not usually bought simply as a dessert fruit, more particularly during the cold winter months, but is largely used for table decorative purposes with flowers. If it is in any way wet or wasty, or has lost its bloom, it has lost more than half its value, or probably all its value to some purchasers. For these reasons I am of opinion that the present system of packing in boxes and wood wool is not satisfactory

For this method of packing it is necessary, after cutting the grapes in the vineyard, to convey them in baskets to a packing house on the farm where it is possible that the basket is over-turned to empty it. The grapes are then examined, trimmed, wrapped in paper and finally tightly packed with wood wool into boxes. If they are not tightly packed they are apt to become damaged very quickly. With all this packing and handling, how can the grapes be expected to arrive in a fresh and attractive condition with their natural bloom? Growers must remember that it costs them 3d. to 3½d. per lb. to ship and sell their grapes in England. A considerable margin must be left for bad shipments, they must therefore get 6d. to 7d. per lb. to bring them on the right side. This means that the retailer will have to sell at 1s. to 1s. 3d. per lb. to secure a moderate profit, as he has also a loss by waste. At these prices the buyers want sound and attractive fruit, otherwise by paying a little more they can buy hot-house grapes which have been thinned out, and which are transported in baskets so as to maintain their bloom.

I have noticed that only the cheap varieties of grapes, such as the Almeria and Sweet Water and other inferior imported varieties are packed in any sort of packing material (for these cork and saw dust are used), but for none of the better varieties arriving on these markets is any sort of packing used; these are all shipped in baskets and crates. Though the method I advocate of shipping grapes is based upon the principle of other countries, I have had to make several considerable modifications, having regard to the different conditions and the longer journey from the Cape particularly, as it is necessary to make use of a non-returnable crate and basket.

I have, I may say, devoted much thought to the subject, have made many observations and enquiries, and have tried various experiments with the object of devising a scheme by which the grapes can be brought over in a sound and attractive condition, without unnecessary handling, and, needless to say, without much additional expense. I therefore suggest to shippers that they should try the method of packing which I will now describe.

CRATES AND BASKETS.

During the previous season, some shippers, on my recommendation, kindly made experiments by shipping grapes in crates and baskets which were forwarded from this side. These were large crates containing twelve 6 to 7 lb. baskets each, packed in three layers, the total net weight of grapes per crate being about 80 lbs. The experiment proved that the grapes would travel exceedingly well in baskets, as they arrived on this side fresh and with the bloom still on them. It was, however, found that the crates were too large to be convenient for the trade. Some losses were incurred in consequence of the inside shelves breaking.

At the commencement of the experiment, as the grapes packed in baskets were new to the trade, buyers were cautious at first to stock them. Benefiting by the experience thus gained, and with the assistance of the manufacturers of crates and baskets in England, a smaller and more compact crate was devised, and with a view of illustrating this new method of packing to the growers I have forwarded to your Department three sample crates, each containing eight small baskets in two layers. These are neat little crates, which will be very convenient to handle, and suitable for the requirements of the trade here.

The three samples differ slightly one from the other, which will enable the shippers to decide for themselves which they consider the most suitable for their requirements.

No. "1" Crate.—Outside measurements, 29" x 16" x 9½"; cost of crate, packed in shooks, f.o.b. London, 97s. per 100; estimated freight, duty, and landing charges, 33s.; total cost per 100, landed Cape Town, 130s. (or about 1s. 4d. each).

No. "1" Special Baskets, to fit the above crate (with handles), to hold 5 lbs. of grapes, 12s. per gross, f.o.b. London. Estimated freight, duty, etc., including margin of profit for importers, 10s. per gross; total cost per gross at Cape Town, 22s.

No. "2" Crate.—Outside measurements, 25½" x 15½" x 10", to hold eight 4½ lb. plaited chip baskets, with handles. The cost of this crate and the baskets will be practically the same as No. "1" crate.

No. "3" Crate.—Outside measurements, 24" x 15½" x 10", to hold eight 4 to 4½ lb. chip baskets, *without* handles. The total estimated cost of crates landed Cape Town is 1s. each. Cost of baskets for same, f.o.b. London, 11s. per gross, plus estimated freight, duty, etc., 6s.; total, 17s. per gross, Cape Town.

As a guide to shippers and for the purpose of comparing the cost of shipping by this method with the present method of ^{packing} packing, I have made the following estimate:—

	No. "1" crate to hold 40 lbs. grapes.	No. "2" crate to hold 36 lbs. grapes.	No. "3" crate to hold 32 lbs. grapes.
	s. d.	s. d.	s. d.
Cost of crate in Cape Town	1 4	1 4	1 0
Cost of 8 baskets in Cape Town... ..	1 3	1 3	1 0
Cost of paper and nails	0 3	0 2	0 2
Railage and Dock dues	0 8	0 8	0 6
Freight in cold storage in ship	3 11	3 4	2 10
Cost of labour on farm for putting up crates, packing, etc.	1 0	0 10	0 9
London charges reckoned on a basis of about 10%	2 5	2 0	1 9
	10 10	9 7	8 0
Equal to	3½d. lb.	3½d. lb.	3d. lb.

I think it will be agreed that my estimates are liberal and, if compared with the cost of shipping grapes in boxes as per statement in another portion of this report, it will be found that the grapes shipped in boxes of 10 lbs. work out at 3d. per lb. delivered and sold on this market. The estimates are on the same basis.

The baskets should be lined with white, transparent, grease-proof paper, and be covered with a single sheet of the same paper when full.

The baskets and crates might, with advantage, be got ready some time before it is necessary to cut the grapes, and when it is intended to commence packing, the crates with the empty baskets should be placed at convenient spots in the vineyard.

The packer should be supplied with a strong pair of grape clippers and a small, sharp pair of thinning-out scissors. He will then cut the bunch from the vine with the former, hold it by the stem and pick out any over-ripe, damaged, or green and small berries. He will also trim the bunch so as to give it a nice shape. Each bunch of grapes should be laid in a single sheet of white sulphite tissue paper of convenient size,

not wrapped, and placed gently into its place in the basket. The grapes should not be touched by the hand. When the baskets are full a sheet of white, transparent, grease-proof paper is drawn over the top and fixed with a thin elastic band or piece of string, the former being more convenient. The basket should then be placed in its place in the crate. When the crate is full, the lid, which has already been stencilled with the required marks for shipment, should be nailed on. The full crates should then be forwarded without delay to the nearest railway station.

It is perhaps well that I should mention that all crates should be clearly marked on the upper lid only with the following words:—

THIS SIDE UP.
HIGHLY PERISHABLE.
WITH GREAT CARE.

(and also the shippers' and consignees' marks.)

The packer, having first ascertained the weight of the crate and baskets when empty, should then weigh the full crate so as to ascertain the net weight of the contents. A card should then be nailed at the end of each crate, giving the name of the shipper and consignee, or agent, the varieties of grapes and the net contents.

The advantages I claim for this method of packing are:—

- (a) That the grapes will not be handled or fingered while being packed: there will be no necessity to send them to a packing house; nor to wrap them in paper or wood wool.
- (b) That the grapes will travel better and retain their bloom and freshness, whilst the percentage of losses in a shipment will be considerably less than under the present system of packing in boxes.
- (c) That the basket is a convenient package for the retail trade on this side.
- (d) That when the grapes are offered for sale the buyers can examine them more readily. It has always been found very difficult for buyers to ascertain the actual condition of the contents of boxes under the present system, and any doubt on the subject may affect prices prejudicially.

In view of the facts given above, I trust that growers of grapes may find it in their interest to give this system a trial. I do not ask them to ship all their grapes in crates and baskets, but think they should make experiments with small quantities.

ALMERIA GRAPES.

I have already dealt with this important subject very fully in my previous reports, but my annual report would not be complete without a brief review of the important features already referred to in previous reports, to which will be added some further valuable information since obtained.

The export trade in grapes from the Cape Colony will always be limited if it is confined only to the varieties of grapes which are at present

shipped. These must be looked upon as a fairly high-class article, and as such the demand will never be sufficient to permit of a large and profitable trade. The export of these types of grapes must, moreover, be considered as rather precarious and of a speculative nature.

If Almeria grapes could be successfully grown in South Africa, the case would be entirely different. The Almeria grape is a great article of commerce; it is well known in all the large consuming centres of Europe and North America. It is dealt with on the same lines and in the same markets as oranges, apples, and bananas, the demand for all these classes of fruit being almost unlimited. The Almeria grape possesses marvellous qualities for keeping. The shipments which arrive here from Spain in October and November are bought up by the trade, stored in basements and warehouses without the aid of refrigeration and kept perfectly well until January, February, March, and April, when they are placed on the market. It is for this reason that they are so immensely popular with the trade. Fruiterers and grocers, when stocking this variety of grape, know well that they cannot suffer much loss, and that they can sell them at any time they are required, whereas if they stock our present varieties of Cape grapes they must sell them within about one week from the date on which the purchase was made.

Almeria grapes are sent to all parts of the world where there is a demand for them, without the aid of cold storage. Shipments have already been made to South Africa in this manner, but to further satisfy myself as to their qualifications for travelling I have, during the past year, on two occasions shipped a box of Almeria grapes to your Department. The first box was purchased on the market. The grapes were grown in Almeria and shipped as ordinary cargo and arrived in Cape Town in an excellent condition, and they remained in good condition for several weeks after their arrival.

The second experiment was a very severe test. I bought on the market a box of grapes which had come from Australia in the cold storage; it was then shipped as ordinary cargo to Cape Town, consigned to you, and it arrived in very good condition, and, I am told, remained in a saleable condition for about 14 days after arrival.

It is therefore clear that if Almeria grapes could be grown in South Africa to retain, even to a moderate extent, these qualities for keeping and travelling, they could be shipped as ordinary cargo in the ventilated holds of the steamers at 25s. rate against 55s. per ton of 40 cubic feet, now being paid for grapes shipped in cold storage.

It has frequently been said that Almeria grapes are of very poor quality. That is a matter which need not concern the grower in the Cape Colony at all. The quality is certainly poor as compared with our other high-class varieties of table grapes, but that is not the point. The markets of England, the Continent of Europe, and America want, and are prepared to pay for the grapes, and if this article can be produced in the Cape Colony the undertaking will probably prove profitable.

Almeria grapes grown in the Cape Colony will no doubt ripen very late, but I think they will be fit to ship towards the middle of April, to arrive here during the months of May and June. During these months there is a fair amount of other fruit on the European markets, but few or no grapes.

As a statement to this effect previously made by me has been called in question, I give below a statement obtained from the Statistical Office of His Majesty's Customs in London, showing the quantities of grapes

imported into the United Kingdom during each month from the 1st July, 1908, to the 30th June, 1909:—

A STATEMENT of the Registered Quantities of Grapes Imported into the United Kingdom during each of the Months, from the 1st July, 1908, to 30th June, 1909.

Countries from whence consigned.	July. cwts.	Aug. cwts.	Sept. cwts.	Oct. cwts.	Nov. cwts.	Dec. cwts.	Jan. cwts.	Feb. cwts.	March. cwts.	April. cwts.	May. cwts.	June cwts.	Totals. cwts.
Germany	...	49	102	108	...	...	...	...	40	208	20	...	327
Netherlands	...	61	311	885	58	15	...	2	...	14	...	2	2,101
Belgium	...	208	292	369	818	1,339	865	1,036	1,350	877	508	310	8,283
France	...	2	15	498	1	...	...	...	6	23	2	...	682
Portugal	...	1,967	36,743	10,043	5	...	...	...	...	...	...	...	95,542
Spain	...	5,990	67,944	320,837	89,400	7,412	65	...	...	...	...	...	537,581
Channel Islands	...	670	4,103	8,163	2,891	416	18	...	...	30	75	198	18,544
Cape of Good Hope	...	...	...	...	...	...	...	52	1,817	2,268	98	...	4,235
Victoria (Australia)	...	...	...	...	...	...	...	...	...	...	85	...	85
British West India Islands	...	...	...	...	15	45	...	...	...	...	...	...	60
From sundry other Countries	...	15	4	13	...	47	...	...	...	8	14	2	103
Totals	8,056	95,325	110,091	340,916	93,188	9,274	948	1,090	3,428	3,213	802	512	667,743

It has been said that if the grapes ripen so late as April and May they would possibly suffer from the effects of the early rains. If this is found to be the case it would certainly be a drawback, and the importance of this contention should not be under-estimated, but the effect of the early rains on the condition of the grapes can only be proved by actual experience.

In order to give some idea as to what prices might be obtained for Almeria grapes from the Cape, I made extracts from newspaper records, and obtained information from leading dealers, and the result of my investigations shows that the average prices during the months of February, March, and April for the last three years were from 3d. to 4d. per lb., wholesale in barrels, and that for the months of April and May the portions of the shipments remaining over, in good condition, turned out from the barrels and packed in 12 lb. baskets, averaged from 5d. to 6d. per lb.

It is therefore safe to assume that Cape Almeria grapes arriving here in a fresh condition during the months of May and June, would at least be able to compete in price with the article grown several months before in Almeria.

On the 11th and 13th May I attended a sale at the Monument market, at which a consignment of various Australian grapes was offered for sale, consisting of about five or six varieties of good-flavoured Australian grapes, packed in cork-dust in boxes, the gross weight of which was 40 lbs., the net weight of the grapes being about 30 lbs. These were evidently shipped as an experiment. In the consignment was a lot of Almeria grapes grown in Australia and packed in exactly the same manner as the other varieties. The result of the first sale was that the high-class table varieties made an average of about 7s. 6d. per box, whereas the Almeria variety made 18s. per box. At the next sale the prices were a little better, the grapes of better flavour making about 8s. 6d. per box, and the Almeria grapes being sold at 24s. per box.

I do not, of course, contend that large quantities of Almeria grapes put upon the market at that time of the year would always make these prices. I am giving this information simply to prove that dealers prefer to stock Almeria grapes to grapes of a better flavour, unless the latter are quite fresh, very attractive, and retain their bloom.

The grapes above referred to were shipped from Australia in the cold storage and the better flavoured grapes arrived in a fairly good condition.

To give some idea as to the cost of shipping these grapes from the Cape in the ventilated hold, I have made the following estimate for a box containing about 30 lbs. net weight of grapes:—

Cost of box	9d.
Cork-dust, etc	6d.
Labour in packing	3d.
Rail to port and dock dues	4d.
Ocean freight	1s. 3d.
London charges	8d.
	3s. 9d.

I have an offer from a merchant to supply cork-dust c.i.f. Cape Town, at £10 per ton of 2,240 lbs., which is equal to about 1-1/14d. per lb. I found that the Australians used 4½ lbs. of cork-dust in packing one box which contained 30 lbs. net weight of grapes. A barrel from Almeria contains about 45 to 50 lbs. weight of grapes, and about 8 lbs. of cork-dust.

With a view to illustrating the popularity of the grape and the magnitude of the trade in Almeria grapes, I have made the following extract from a Consular Report of the district of Malaga for 1907, from

which it will be seen that during that year 2,446,638 barrels of grapes were shipped from Almeria to the ports mentioned:—

Grapes —		Grapes—	
Destination.	Whole Barrels.	Destination.	Whole Barrels.
Liverpool... ..	568,354	Philadelphia... ..	28,637
London	315,741	New Orleans	2,599
Glasgow	182,604	Baltimore	107
Hull	80,080	Buenos Ayres	1,117
Bristol... ..	34,791	Hamburg... ..	208,244
Cardiff	32,912	Baltic Ports... ..	9,850
Manchester	26,567	Amsterdam	911
Newcastle	25,735	Bremen	478
New York	849,139	Antwerp... ..	116
Boston	75,033	Malaga & other ports	3,614
		Total	2,446,638

Apart from the advantages which this grape possesses as an article for export, I consider it will prove a profitable fruit for the South African markets after all the other fruit are over.

Since my previous report I have been in communication with the British Vice-Consul in Almeria, who has very kindly given me some interesting information as to the conditions prevailing in that province. He says that since the phylloxera scourge which over-ran the whole province during the early nineties, the growers have used the American plant, on which they have grafted the "Chanes" or "Almeria Grape." It was from a village called "Chanes," near the northern confines of the province, that the first grapes were sent to the market about 55 years ago.

Among the American plants chiefly favoured are "Rupestris Lot"; "Riparia Aramon"; "Rupestris Ganzin."

The grapes shipped from Almeria during the early part of their season—namely, from July to August—are all of Castiza classes, the two chief kinds being Molinera and Rosada. These are, however, non-keeping varieties, and are simply shipped to catch the early market. The "Chanes," which is the white or keeping variety, is shipped during the latter portion of August up to the end of October.

The Consul remarks that throughout the Province of Almeria there are a variety of soils suitable for growing the grapes, but the best grapes are grown on gravelly soil, and that the altitudes most favourable are up to about 3,000 feet. He also informs me that the vines are irrigated three times a year, if necessary, and when water is available. The grapes are grown on trellises with sides and tops, the poles being about 7 feet from the ground. Over each are stretched smooth galvanised iron wires.

I am informed that the matter of the greatest importance is the selection of the best vines, which will produce the grapes most suitable for keeping, and that the growers are constantly taking cuttings from the vine stocks which have proved most successful in this respect.

Mr. Chris. Burger, a Cape Colony farmer, who recently visited the Province of Almeria, at my request kindly obtained some information upon this subject. He will, I understand, communicate through the Press the information obtained by him on his return to the Cape Colony. He informs me that the principal features in connection with the production of the keeping varieties are:—

- (1) The selection of the cuttings, and
- (2) The fertilisation of the bunches when in flower

The temperatures in Almeria are recorded in a standard work for 1908, as follows:—

Mean, 59° Fahr.; Maximum, 104° Fahr.; Minimum, 41° Fahr. for the Northern part; and for the Southern part

Mean, 64.4° Fahr.; Maximum, 109.4° Fahr., and on a few occasions its goes down to freezing point.

The following table of rainfall in the Province of Almeria will also be of value to persons wishing to make a comparison between the climatic conditions of the Cape Colony and those prevailing in Almeria.

TABLES OF RAINFALL, 1905—1907.

Month.	Days per Month on which rain fell.			Quantity in one eighths of an inch (a).				
	1905.	1906.	1907.	Aver. 3 years.	1905.	1906 (b)	1907.	Aver.
January ...	3	2	2	2.33	5.20	1.05	3.73	3.33
February ...	1	1	2	1.33	0.43	1.25	0.92	0.87
March ...	...	4	...	1.33	...	9.79	...	3.26
April ...	3	6	3	4.0	5.90	8.62	3.98	6.17
May ...	1	3	4	2.66	1.33	1.84	2.46	2.88
June ...	1	1	...	0.66	1.16	1.18	...	0.78
July ...	1	...	...	0.33	1.33	...	...	0.44
August ...	...	...	...	...	...	...	...	...
September ...	2	7	1	4.33	10.80	50.10	6.50	22.47
October ...	2	2	4	2.66	7.53	12.50	1.25	8.09
November ...	1	2	8	1.66	9.20	6.80	21.05	12.35
December ...	3	6	1	1.33	7.70	14.86	1.93	9.16
Total ...	21	31	31	28.66	50.60 or 64 in	110.64 or 13.83 in.	47.83 or 6 in.	69.69 or 87 in. (c)

The 1908 returns are not yet published.

(a) The rainfall in the returns is expressed to two places of decimals in millimetres and has therefore had to be reduced to one-eighth of an inch.

(b) This is regarded as one of the worst seasons on record for the grape grower.

(c) It will thus be seen that allowing for the abnormal rains of 1906 about 6 in. is a fair average rainfall.

PINES.

During the past season about 32,000 boxes of Pines were shipped, as compared with 2,440 during 1908. Although the figures for 1909 are not to be quite depended upon, since during the season several shippers batted three boxes together in one bundle which was recorded as one box, I think my estimate as above stated is fairly correct.

The first shipments arrived during the last week in February and the last shipments of any importance during the last week in April, though small quantities arrived in an irregular manner for several weeks after this latter date.

The prices obtained during the past season showed some considerable decrease, as compared with those of the previous season; this I do not consider due so much to the large increase in the shipments over the previous year, as to the very poor quality of the fruit. There can be little doubt that if larger and better fruit are shipped the demand will considerably increase. The first shipments realised 3s. 6d. to 4s. per box of one dozen; these prices were maintained for a few weeks, but during March they were making 2s. 6d. to 3s. 6d., and for really first-class fruit up to 5s. per box. During April the prices were 2s. to 3s., and those

which arrived during May only made about 1s. 9d. to 2s. 6d. per case. The above prices are for the small, or Queen pines. During April and May several small shipments of the larger pines were received. These fruit were sold at an average of about 1s. 6d. each; they were described by shippers as "Giant Kews," but they were not similar to those so named during the previous season. The dealers here called them "Cape Giants," and I think it would be better to agree to call them by this latter name, as it better describes the nature and country of origin of this particular pine.

The fruit generally arrived in a much sounder condition, but there has been a considerable falling off in quality. The majority of the fruit was exceedingly small, some of the pines weighing only 10 ozs. to 11 ozs. each. It is not the slightest use sending these very small pines to this market, where even the largest sized "Queen" pines are looked upon as small. Dealers are accustomed to see very large fruit, especially the smooth Cayenne from the West Indies, which are sold at from 1s. 6d. to 3s. each in large quantities.

I think it will in future be found more profitable to ship "Cape Giants" than "Queens" though for good large "Queens" a very remunerative price will always be made.

From about the middle of April to the close of the season almost every pine arriving was found to suffer from a disease known as "Black Core," the inside of the fruit being quite black, although the outside showed no sign of any disease. I have on former occasions pointed out that pines should not be exported after the early rains have set in, as I felt sure the disease was brought about by excessive dampness. I communicated with the authorities at Kew Gardens, and sent them some samples of the fruit thus affected, requesting them to explain the cause of the disease. In reply they kindly supplied me with the information contained in the following letter:—

Royal Gardens, Kew.

"Heart-Rot of Pineapples."

- "The disease is purely physiological in its nature, and is brought about by an excess of moisture in the atmosphere (your rainy season) which checks transpiration, thus preventing the translocation of certain substances in the fruit, which should be effected quickly during the period of ripening to assure good sound fruit.
- "The same happens to pineapples grown in this country if the atmosphere is allowed to approach saturation point during the ripening process.
- "A similar heart-rot of apples is prevalent in the United States during an exceptionally wet season.

(Sgd.) GEORGE MASSEE,

May 11th, 1909."

Shipments should be confined (in so far as these markets are concerned) only to the very largest fruit. "Queens" should not weigh less than 20 ozs.; they should have a bright reddish colour, with a large fresh crown, and should be cut with about an inch of the stalk left on the fruit.

The system of packing as first recommended by me, viz., in single layers of one dozen each, with wood wool packing is now being generally adopted and is proving satisfactory. The boxes should be made in accordance with the size of the fruit shipped, to hold one dozen each, and with a centre division across the inside to prevent the boxes above from bruising the fruit; three boxes should be battened together. It is not necessary to provide lids for the two lower boxes in the bundle thus

formed. For packing wood wool or mealie-cob leaves may be used, whatever is more convenient and economical; the wood wool need not be very fine; any fairly coarse quality is good enough. No grass must, however, be used for packing, as it is much too heating. If mealie-cob leaves are used it is necessary that the leaves should be shredded or torn up and be quite dry and white. Large, unshredded leaves are not altogether suitable.

Pines require a great deal of ventilation and suffer from a considerable amount of shrinkage during the voyage. They must, therefore, be tightly packed, but with as little wood wool as possible.

Several experiments were made during the past season by shipping in cold storage, as well as by means of the ventilated holds of the steamers. It is possible that Natal shippers may eventually find it necessary to adopt the former and more expensive method, but I fail to see that any real advantage can accrue to Cape Colony shippers by adopting this course, as, so far, I have been quite satisfied with the ventilated holds for pines.

APPLES.

The quantity of apples exported from the Cape Colony is hardly worth mentioning and is, I regret to say, apparently decreasing, as the following figures for 1908 and 1909 will show:—

Number of boxes exported, 1908	...	...	...	...	...	450
" " 1909	...	...	...	...	...	201

I am at a loss to understand why the trade in this fruit has not made more progress in the Colony. The apple is one of those fruits which may be termed a "great article of commerce," and the demand for it on the markets of the world is almost unlimited. If growers in the Colony can produce this fruit at a low cost they can rest assured that the markets of Europe will take all they can ship.

I was hoping to see the development of a large export trade in this fruit in the near future, and I still believe it to be possible.

During the year ending 30th June, 1909, the United Kingdom imported nearly three million cwt. of apples. A cwt. is equal to about three bushels, and a bushel of apples is worth about 7s. to 10s.

The following were the chief exporting countries:—

	cwts.
Canada	1,270,891
United States of America	761,391
France	294,499
Belgium	270,034
Netherlands	53,694
Portugal	84,734
Germany	1,598
Tasmania	182,486
Victoria	50,214
South Australia	14,756
New South Wales	1,248
West Australia	53
Cape of Good Hope	49
New Zealand	22

To deal with the whole question of the apple trade in this report would be quite impossible. Volumes have already been written on the cultivation of the apple, the different features of the various varieties and their suitability for different climates, their seasons, diseases and the

methods of their extermination, and on the packing, grading, transportation and marketing of this fruit. I need, therefore, only deal briefly with a few of these subjects.

Varieties.—On a former occasion I made inquiries from several large dealers on these markets as to the varieties which make the best price. I found that they were by no means unanimous in their opinion, but the following varieties were most favoured:—

Dessert.—Cox's Orange Pippin. Ribstone's Pippin. King of the Pippins (Adams Pearmain). Sturmer Pippin. New York Pippin (Cleopatra). Newton Pippin (Oregon). Blenheim Orange. Jonathan. Russet. Baldwin.

Cooking.—French Crab. Rhodes Island. Greening. Wellington.

It must be clearly understood that I only mention these varieties because they find most favour on the market here. Different countries favour different varieties because they have learnt by experience those which can be most easily produced and which travel best. It is only by actual experience that growers in the Cape Colony can attain to similar knowledge.

Seasons.—Apples are imported into England almost all the year round, but we need only concern ourselves with the prices and conditions of the market at the time when it is possible to ship apples from South Africa. American and especially Californian apples arrive on the European markets up to almost the end of March, but during that month, in consequence of the lateness of their marketing season, these apples are much out of condition. The Australian, chiefly Tasmanian, apples, commence to arrive about the first week in April.

The price obtained for fresh, well-packed apples is generally highest during March and up to the arrival of the Australian apples.

If I am correct in my assumption that Cape apples ripen about the same time as the Australian fruit, I contend that they should be able to compete on the market with Australian, since they have the advantage of at least 21 days start—that being the difference between the length of the respective sea voyages—and a slightly cheaper freight, viz., 2s. per bushel box from the Cape, as against about 2s. 4d. from Australia. During these three weeks, Cape growers could ship about six shipments of 30,000 cases per vessel, or a total of 180,000 cases without much upsetting the markets. After that we must compete on equal terms with the Australian fruit, but I see no reason why we could not do so, although the cost of packing is a point in their favour, as they have the advantage of very cheap boxes made locally, whereas boxes for Cape fruit have to be imported. The figures I have quoted as possible Cape shipments are not excessive; the Australians think little of landing 100,000 bushels in one week.

Prices.—The prices vary much and depend on the variety, the condition of the fruit on arrival and the conditions of the market; but as a guide I think fair average prices would be from 6s. to 11s. per box of one bushel. I have estimated that the charges for packing material, labour, freight, dock and railway charges for this quantity of fruit would amount to from 4s. to 4s. 3d. per box. These figures do not, however, include the cost of the fruit.

Packing.—The best method of packing, as adopted by most countries is in the standard size one bushel box, 10" deep by 11" wide by 20" long, the net weight of fruit contained therein being about 40 lbs. to 45 lbs. The use of small trays by Cape packers is costly and must be abandoned. The fruit, after having been carefully graded, should be wrapped in tissue paper, either plain or suitably printed, and then carefully and tightly packed in tiers with four to five apples in alternate rows, or five apples in every row in accordance with the size of the fruit. Very tight packing

is most essential; no wood wool need be used excepting when necessary to tighten the packing. The packing and grading of apples is a fine art, which must be studied, and can only be learnt by experience. It cannot be adequately described in a brief report.

MELONS.

During the past season only about 216 cases of melons were shipped as compared with 1,494, cases during the previous year, the reason for this falling off being that during 1908 experiments were made in the shipment of several varieties, almost all of which proved to be bad travellers. There is at least one variety, however, which has proved to be quite a good traveller, and which generally arrived here in a very sound condition. This variety is called at the Cape the "Winter Melon," and is now known at Covent Garden as the "Spans-speck." It was first shipped by the Rev. S. J. du Toit, of the Paarl, and I have in my previous reports recommended growers to ship this variety only. It is round in shape, with a smooth, greenish-white skin, green flesh and has an excellent flavour. Unfortunately, however, its appearance is against it, and its real excellence is not known on these markets to buyers, who are accustomed to see a small oval or round yellow netted melon grown in a hot-house which makes about 1s. to 2s. 6d. each wholesale. Buyers have however, already become accustomed to the rather rough-looking Canteloupe melon, which is an excellent red-flesh melon imported from Spain and France, making about 2s. 6d. to 4s. each wholesale, and I have every hope that in time the Cape Winter Melon will establish itself on these markets and that a profitable trade will result.

In consequence of the different sizes of melons it is rather difficult to suggest the best method of packing, but I may say that each melon should be wrapped in paper and packed tightly in boxes of convenient size with lots of wood wool. The size of the fruit should not be more than from six to eight inches in diameter, or about the size of an Edam cheese.

The question of the temperature most suitable for the transportation of the different varieties should be studied, and I recommend growers to take advantage of the cold storage experiments about to be carried out by the Government.

During the past season the following prices were made for Winter Melons when sound and of fair medium size:—

February	5s to 6s. per doz.
March	10s. to 12s. per doz.
April	12s. to 13s. per doz.

SUNDRY FRUITS.

Granadillas.—Small quantities of granadillas have been received during the past few seasons from the Cape Colony; larger quantities arrived from Natal. These were packed in single-layer trays and made from 3s. to 7s. per tray. The variety of granadilla grown in the Cape Colony and Natal, that is, the small brown, rather shrivelled variety, is not very acceptable to the English market as it is not known here. The variety better known is the large, yellow, smooth-skin fruit, which comes from the West Indies and other parts. I have on more than one occasion sent seeds of this latter variety to correspondents who communicated with me upon the subject, and I am looking forward with interest to the result.

Pomegranates.—During each season small quantities of pomegranates arrive from the Cape. This fruit, however, can only be sold in very small quantities. If they are large and showy they will be bought by fruiterers

chiefly for decorating their shop windows, and for small quantities they will pay good prices, probably from 6s. to 12s. per box of 20. The Cape pomegranates are altogether a finer and more attractive fruit than those which arrive on these markets from elsewhere.

Quinces.—Small consignments of quinces have also come forward at different times. This fruit is comparatively unknown on these markets, and only very small quantities can be sold. If they could become better known I think a fair market could be created for them as they are a good stewing fruit, besides which they might also probably be used by jam manufacturers; but in the latter case they must be shipped cheaply and in large quantities. With this object in view, experiments should be made by shipping small quantities packed in one bushel boxes in the ventilated hold of the ships.

MEMORANDUM BY DEPARTMENT OF AGRICULTURE.

GENERAL OBSERVATIONS.

Shippers must make their own arrangements for forwarding their fruits to the overseas markets, and for its sale, through their own agencies.

It may be laid down at once as a fundamental principle governing the whole fruit export trade that *only fruit of the very highest quality can*, with any hope of profit, be exported; and it cannot be too strongly urged that the standard of excellence must be in accordance with the judgment of European markets, and not the judgment of the South African grower. Not merely must the variety be suitable, but the selection of the fruit itself must receive the closest attention, and every process affecting its selection, packing and transport must be attended to with the most scrupulous care.

In view of these considerations the following rules are laid down at the outset for the guidance of all who propose to place Cape fruit on European markets:—

- I. The BEST FRUIT, and the HIGHEST QUALITY ONLY, must be shipped.
- II. The export trade should only embrace those VARIETIES approved of in European markets as named below.
- III. Fruit must not merely be of the highest quality, and the approved variety, but must be UNIFORM IN SIZE, DEGREE OF RIPENESS AND COLOUR. The SELECTION of export fruit *must rigorously exclude all marked or injured fruits*, and in the case of grapes, SMALL, BROKEN OR UNRIPE BERRIES.
- IV. The PACKAGES AND PACKING MATERIAL must be of the sizes and quality as nearly as possible hereafter described.
- V. The BRANDING OF BOXES must be strictly attended to.
- VI. The climatic conditions affecting the PICKING of fruit must be constantly kept in view. Fruit gathered in the heat of the day, or exposed unnecessarily to the heat after being gathered, or carelessly handled, or over-ripe when gathered, will not travel well.
- VII. In order to reduce the period of time in COLD STORAGE to a minimum the instructions hereafter laid down must be strictly observed.

VIII. The LOADING of fruits at Railway Stations and Sidings should be personally supervised by the shipper.

I. *Quality of Fruit*.—It cannot be too earnestly impressed upon all fruit growers that the person who pays the piper calls for the tune, and that therefore the South African opinion of export fruit is not by any means final, and the closest attention must be paid to every suggestion of defective standards reported by the Government representative and shippers' own agents.

II. *Varieties of Fruits*.—The Trades Commissioner, having given the most careful attention to the market conditions and consulted the principal fruit factors in Great Britain, has supplied information on the varieties of fruit most likely to prove remunerative for export, which is embodied under this head. The varieties set down are as nearly as possible placed in the order of their popularity, and shippers should have the most careful regard to this order of precedence in preparation and packing.

1. APPLES.

Dessert.

Cox's Orange Pippin.
Ribstone's Pippin.
King of the Pippins (Adam's Pearmain).
Sturmer Pippin.
New York Pippin (Cleopatra).
Newton Pippin (Oregon).
Blenheim Orange.
Jonathan.
Russet.
Baldwin.

Cooking.

French Crab.
Rhodes Island.
Greening.
Wellington.

2. PLUMS.

"Apple."
"Satsuma."
"Kelsey."
"Wickson."

The "Satsuma" has been in particular demand, although a very limited quantity of this variety has been forwarded from the Cape. In the Plum trade every effort should be made to produce large fruits of the most attractive colours.

"Burbanks" are generally condemned as unsuitable, and *should not be exported*.

3. PEACHES.

"Early Alexander."
"Waterloo."
"Brigg's Red May."

Cape varieties of the red melting type of free stone.

The two following varieties are popular with the trade, but must be good samples:—

"Royal George."
"Gladstone."

The joint opinion of the leading members of the London fruit trade is that any variety of Peach to which the following description may be applied can be shipped:—

"The market requires a fairly large peach, as round and with as much colour as possible. It must have a white flesh, and must be a freestone. There is not the slightest use shipping a yellow peach, no matter how good its flavour is. Any fruit with a poor colour, or a point, is quite unsuitable."

It is to be hoped that shippers will give the most careful attention to these points.

4. PEARS.

"Bon Chretien."

"Conice," or under its Cape names *Beurre du Bois*, Flemish *Beauty*, and *Rustenburg*.

"Louise Bonne."

"Beurre Bosc."

"Winter Nelis."

"Beurre Hardy."

"Glout Morceau."

"D'Angouleme."

"Clapps' Favourite."

"Clairgeau" is recommended, but should be branded "stewing."

"Souvenir du Congres" is popular, but second grade.

"Easter" is thought to be too late.

5. GRAPES.

Red Hanepoot and Barbarossa make the highest prices and travel well.

Hermitage is in good demand, but the berries must not be small.

Red Hanepoot is much sought for, but the colour must be good and all small berries removed from the bunches before packing.

White Hanepoot does not usually reach the market with a sufficiently attractive appearance.

Raisin Blanc travels well, and generally reaches the market in sound condition.

"Black Prince" grapes *must not be shipped*, and the small white variety called "French Grape" is *quite unfit for export*.

The order of popularity of varieties is placed thus:—

Red Hanepoot.

Barbarossa.

Hermitage.

Raisin Blanc.

White Hanepoot.

6. MELONS.

The "Winter Melon" and the variety called "Bejudiere" travel best and secure highest prices. Both are smooth skinned varieties. All melons of the "laced" or "netted" kind generally arrive in bad condition. Shippers must pay particular attention to the size of this fruit in demand for the market. Each melon should be wrapped in paper and packed tightly in boxes of convenient size, with a large quantity of wood wool. The size of the fruit should not be more than from 6 to 8 inches in diameter, or about the size of an Edam cheese, and anything varying considerably from this dimension should not be shipped.

7. APRICOTS.

It is strongly impressed upon all shippers that this fruit is not regarded as a first-class dessert, and that inferior Apricots are largely used for cooking purposes. There is, however, always a demand for a limited quantity of large and well-coloured fruit for dessert purposes.

8. Quinces, Pomegranates, and Granadillas, it is believed, cannot at least for some time to come be developed. Limited quantities are acceptable, and if carefully selected and well coloured will probably have a profitable sale, but they must be of such appearance as will commend them as much for table decoration as for actual use.

III. *Selection of Fruit.*—In the selection of fruit the special points to be attended to are:

- (a) The degree of ripeness must as nearly as possible be determined with a view to the fruit being presented for sale after the oversea journey in the most attractive manner. It is extremely difficult to lay down rules which may be of any practical use to fruit growers on the ripeness of fruit for packing, and the only suggestion which can be made here is that fruit farmers who have already very little or no experience of the preparation of fruit for export should visit those packers who have been engaged in the industry for years, and who will be quite willing to afford practical demonstration based on results of experience.
- (b) The condition of all fruit intended for shipment must be as nearly perfect as possible. The fruit must be quite sound, free from marks or deformities of any kind, and true to type.
- (c) The size must not be less than the dimensions given in Appendix A to this Bulletin, which sets forth the minimum size for each kind of fruit.
- (d) Uniformity from every point of view must be strictly adhered to with reference to the size, colour, and shape, so that a package when opened will present as neat and regular appearance as possible.
- (e) In the case of grapes it must be understood that the thinning of bunches is imperative, the experience of past seasons being that a handsome bunch with comparatively few berries, but of good size, fairly loose on the stalk and well coloured, fetched far higher prices than thickly loaded bunches of uneven-sized berries.
- (f) In picking grapes laterals must always remain attached to the main stem of the bunch, that is a small piece of the stalk on either side of the stem bearing the grapes must be allowed to adhere to the stem itself.
- (g) In the case of all fruits, bad, weak, small, badly coloured and unripe fruits or berries must be entirely excluded.

IV. *Packing and Grading.*—The greatest possible care must be given to every detail involved in the packing and grading of fruit.

The packages approved of for export purposes for the various sorts of fruit are as set forth in the following table, which gives, in the cases of the principal export fruits, two sizes to meet the requirements of "Extra Selected" and "Selected" qualities. The depth of the boxes may be made greater or less at pleasure, and for the ensuing season shippers must

use their discretion in the use of deeper or shallower boxes for certain kinds of fruit, in view of special suggestions made hereafter.

Class of Box.	Size.	For Grades.
Large Grape	24 x 18 x 6 $\frac{1}{4}$	"Extra selected."
	28 x 18 x 6	"Selected."
Small Grape	18 x 12 x 6	"Extra selected."
	18 x 12 x 5 $\frac{1}{2}$	"Selected."
Peach and Nectarine...	18 x 12 x 4	"Extra selected."
	18 x 12 x 3 $\frac{1}{2}$	"Selected."
Plum	18 x 12 x 3	"Extra selected."
	18 x 12 x 2 $\frac{3}{4}$	"Selected."
Pear... ..	18 x 12 x 6	"Extra selected."
	18 x 12 x 5	"Selected."
Apricot... ..	18 x 12 x 2 $\frac{1}{2}$	"Extra selected."
	18 x 12 x 2	"Selected."
Orange... ..	27 x 12 x 12	"Extra selected."
Half Orange	1 $\frac{1}{2}$ x 12 x 12	"Selected."

The following remarks with reference to the packing of different fruits should be carefully studied:—

Apples.—Several small consignments of apples have been sent to London during the past season, and on the whole have met with fairly successful results. It must, however, be remembered that the competition in the sale of this fruit is exceedingly keen owing to the highly organised condition of the apple trade in several parts of the world. The points to be remembered are:—

1. That only the very highest class fruit has any chance of making remunerative prices;
2. That the fruit must be sufficiently hardy to carry in ventilated holds in order to obviate the enormous expense of cold storage freight;
3. The best method of packing, as adopted by most countries, is in the standard size one bushel box, 10" deep by 11" wide by 20" long, the net weight of fruit contained therein being about 40 to 45 lbs. The use of small trays by Cape packers is costly, and must be abandoned. The fruit, after being carefully graded, should be wrapped in tissue paper, either plain or suitably printed, and then carefully and tightly packed in tiers with 4 to 5 apples in alternate rows, or 5 apples in every row in accordance with the size of the fruit. Very tight packing is most essential. No wood wool need be used, excepting where necessary to tighten the packing.
4. That well-grown apples of good keeping varieties, if carefully handled and stored, will have for a long time to come a profitable outlet in South Africa itself.

Plums.—"Apple Plums" and "Satsumas" are most favoured, both on account of their flavour and attractive appearance. "Kelseys" are also good plums for the London market; they travel well, have a bright and attractive colour, and are of good size and flavour. "Wicksons" are also fairly attractive in colour, and of a good size, but of very poor flavour, besides which they usually arrive out of condition, either too green or else over-ripe. The packing of plums is simpler than that of other fruit; they should be tightly packed, with as little wood wool as possible, wrapped in fancy paper, well graded, and in counts of from 24 to 36. The

boxes should be battened together in sets of three. Wood wool must only be used to protect the fruit from the wood, and from three to five trays or small boxes might be nailed together with a view to saving labour in handling and a reduction of market dues.

Peaches.—The London market requires a fairly large peach, with white flesh, round in shape, and with as much colour as possible; it must not have a point, and must be juicy. Colour without size will not avail. Size and colour must be combined in a perfectly saleable article. Experience shows that cotton wool packing is not suitable for a long journey. It is too dense, and does not allow the cold air to get to the fruit soon enough to retard the progress of ripening. The best method of packing is that which has for a long time been adopted by the Cape Packers, that is in trays holding from 16 to 24 fruit, strong enough to carry the fruit; each peach to be wrapped in suitable paper, and packed in soft wood wool of the best and finest quality. To save market dues and to facilitate handling the trays should be battened together in sets of three. The Government official grades should be carefully followed. Only fruit of uniform size, shape, ripeness, quality, and colour should be packed in each tray. Each tray should be fully filled with the fruit.

Nectarines.—The observations with reference to peaches will apply, but this fruit must be of good size and colour and of the *free stone* variety; the more colour the better it is appreciated. There is no objection to the yellow flesh nectarines in Great Britain, which are known there as the Golden Nectarine, and are rather sought after. Packers must, however, be very careful about the grading. All fruit in each box must be uniform in size and colour; they should be packed in trays or boxes of 24 to 28, wrapped in paper, and a little wood wool should be used, but it must be of the finest and the best quality. The trays should be battened together in sets of three.

Pears.—As little wood wool as possible must be used and every effort made to place the largest quantity of fruit possible in each box. The retail fruit vendor attaches naturally most importance to the quantity as well as the quality of the fruit in each box, and boxes which might easily comprise 20 or 24 should not contain, say, 16 fruit. Small counts of 20 to 32 may be a little more costly, but they seem to make better prices than the large counts of 54 to 80. It is specially necessary in the case of pears to exclude badly shaped fruits or those in any way injured, and a few such specimens in a box will probably spoil the price of the remainder. Each pear should be wrapped in a piece of white sulphite paper, and with a view to saving cold storage space and market dues three single layer trays nailed together is desirable in making up shipments. "Bon Chrétiens" are a very popular pear on the London market, but they are very bad travellers, as they ripen so quickly. The general mistake is to pack the fruit too ripe, and it requires the greatest skill and experience to know exactly when to gather it for packing. Only expert packers should be employed in packing this variety of pear. Other varieties, like "Louise Bonne," "Beurre Bosc," "Winter Nelis," and "Glout Morceau," though not quite so popular, make fair prices, and generally arrive in a good condition.

Grapes.—Shippers must keep in view the fact that almost the whole of the best grapes brought into the English market during the winter months are used largely for decorative purposes, and therefore the fruit must above all things have the very finest appearance. It must be sound, dry, as attractive as possible, must retain its bloom, and the berries must be large and hang free and loosely on the bunch. The bunches must not be tightly grown, nor be of a scraggy appearance, but must have a good shape, and in order to attain this end the berries should be thinned out

when about half developed. It is absolutely necessary that packers be supplied with grape (thinning out) scissors with which to trim the bunches, and pick out all the over-ripe, immature, or damaged berries. The bunches must not be fingered unnecessarily, but handled only by the stalk. The Trades Commissioner has had considerable difficulty in consultation with the leading dealers in Cape fruit in Great Britain to decide upon the most suitable methods of packing. To meet these requirements he has suggested as one means of placing Cape grapes in the most attractive manner before the consumer, the Continental method of packing in baskets or punnets, which are then placed in crates. The sample crates and the punnets are available for inspection at the Department. For further particulars, see Appendix "C."

Apricots.—This fruit should be packed in boxes with divisions for each layer of fruit, or otherwise in separate trays, three of which should be nailed together to save space, the two lower boxes not requiring covers. Each fruit should be wrapped in a piece of tissue paper, and this might be printed with some ornamental device or with the trade mark of the shipper. Very little wood wool should be used, none being placed between the fruits—its only purpose being to protect the fruit from the wood, at the top and bottom and sides of the case. Particular attention should be paid to the grading of the fruit according to size, and only large, well-developed fruit with good colour should be shipped.

So far as the present system of packing in boxes is concerned, shippers must in future wrap their grapes first in white sulphite paper and then pack tightly in wood wool. Too much wood wool must not be used. Shipments in which very little packing material is employed arrive always in perfectly sound condition. The object of using wood wool is not to preserve the grapes, but to protect them from being shaken and bruised, and the sulphite paper aims at preventing the wood wool becoming mixed with the berries and secure for the bunches a neater appearance when taken out of the boxes. Shippers are left entirely to their own discretion whether they shall use the large or the small grape box, opinion being divided among fruit factors whether the one or the other is preferable, and it is of particular interest that the weights stamped on the boxes should not be greater than the actual amount of the contents when supplied to the retailer. Economy in packing must be carefully attended to, as there are constant reports of waste of space and wood wool in putting up smaller quantities of fruit in boxes than the box can contain with efficient packing.

It cannot be again too forcibly impressed upon growers of grapes for export that *the thinning of bunches* is essential to profitable trade, and in the English hot-house grape nurseries from which grapes are frequently sold at from 2s. 6d. to 3s. 6d. per lb., it is estimated that it costs $\frac{1}{2}$ d. per lb. to attend to the work of thinning out. The Trades Commissioner estimates that, with care, thinned Cape grapes will fetch from 3d. to 6d. per lb. more for any given variety than if left unthinned.

The WOOD WOOL for fruit packing must be of fine quality, but at the same time clean, bright, and elastic. Wood wool which is coarse and hard of fibre is objectionable.

V. Branding of Packages.—Every package containing fruit for export should be clearly branded on the ends with the quantity of fruit, name of variety, and the name of the shipper. Should a shipper have a special brand for his fruit this may be used in addition to, or alternative to, the shipper's name; but too much stress cannot be laid on the necessity of accurate branding. In the case of grapes, the net weight, after allowing 20 per cent. for shrinkage, should also be stamped on the ends of the cases.

VI. *Handling, Transport, and Loading.*—With all fruits for export the gentlest and most careful handling is necessary in packing, riding to the stations, and loading and off-loading on the railway. Boxes of fruit should not be thrown carelessly, or placed on their ends, and it is advisable that some soft material, such as wood shavings, straw, or hay should be placed on the floors of farm wagons and railway trucks before loading. The personal supervision of the farmer himself should be given to the transport of fruit from the farm to the station, and its handling and loading at the station.

VII. *Consignment Notes.*—The shipper must look to his own interest in carefully filling up the quantity, variety, marks or brands and weights of all consignments delivered at railway stations or sidings. Copies of consignment notes should be kept, and the special labels provided by the Railway Department should be used. All fruit should be consigned to the Dock Traffic Manager, Cape Town, after the necessary arrangements are made with the Harbour Department for the handling of shipments, and the full name and address of the European agent, with any special shipping instructions, should be forwarded without delay.

VIII. *Inspection of Fruit.*—In order to meet the wishes of shippers, the scheme of Government inspection of fruit will be continued on somewhat similar lines to that in operation in past seasons. It must be understood, however, that only the fruit of those shippers who shall have previously signed and forwarded to the Department of Agriculture an agreement in the form shown in Appendix "B" attached to this bulletin will be examined, and it is requested that shippers desirous of having their fruit inspected and branded by the Government should notify this office without delay.

IX. *Cables.*—The Government will continue its system of cable advices to the Trades Commissioner with reference to the quantities and varieties of fruit shipped, but, should any individual shipper desire to cable, the especial code in use by the Department will be at his disposal, and any facilities that can otherwise be afforded him will be available.

X. *Agents for Sale of Fruit in Europe.*—The Department has taken steps to compile a special list of the most reliable agents in Great Britain and certain of the principal Continental cities in Europe for the sale of Cape fruit. All such agents have been selected with due regard to their financial standing and business connection, and their names and addresses will be available for exporters on application. It must, however, be clearly understood that while the Department has made the strictest inquiries with regard to the agents whose names appear upon its list, it cannot take any responsibility whatever for the business relations between shippers and such agents. Shippers are recommended, through their banks or otherwise, to inform themselves, in addition to the information supplied by the Department, of the reliability and business reputation of those to whom they consign fruit. It is recommended wherever possible that the shipment of fruit should be effected through agencies of one of the South African Banking Companies, whose European Branches would in the circumstances take every precaution to protect its customers.

XI. *Reports from Trades Commissioner and Agents.*—Shippers of Cape fruit in their efforts to attain the highest standard possible should strenuously endeavour to carry out the suggestions made in their special reports by the Trades Commissioner and the principal fruit agencies in London.

XII. *Invoices and Accounts.*—It is suggested that shippers of fruit should provide themselves with neat Invoice Books setting forth in the case of each shipment the fullest particulars of quantity, weights, numbers, marks, date of delivery to railway, steamer by which shipment is intended, and full name and address of consignee or agent. These invoices, with the use of carbon paper, might be made out in triplicate, one

copy being tacked on the consignment of fruit on the end of a box and under a slip marked "Dock Traffic Manager." This would enable the Harbour Department authorities to check each parcel of fruit with the railway consignment note. A second copy should be sent direct to the London or other agent of the shipper and the third kept for reference. Shippers should arrange with their agents to have general reports by next mail on the condition in which their fruit was received, and its quality and general character, and payment of accounts through a bank or otherwise should be provided for at periods of from seven to fourteen days after the sale of fruit, except of course in those cases where a bank was the medium of collection, or where accounts were "Cash against Documents."

XIII. Influence of Locality.—It has been pretty clearly demonstrated that grapes which have been grown in shady places and in damp soils have proved quite unsuitable for export, inasmuch as apparently they cannot carry satisfactorily in cold storage. It has also been clearly shown, on the other hand, that those grapes grown in dry and sunny positions, on elevated and sloping ground, and in well-drained soils, travelled with perfect safety and reached the market almost invariably in the best condition. No doubt, in the latter case the berries were somewhat smaller, but it is, of course, much better to have a smaller grape in a quite sound state than very large berries which become almost immediately wasty on being taken from cold storage. The Department proposes making such investigations as may be possible with a view to showing how far situation and quality of soil may influence the market qualities of export grapes, and the support of all interested in the fruit trade is earnestly solicited in this as in all other experimental work that may be undertaken for the development of this important industry.

XIV. Almeria Grapes.—The Trades Commissioner has repeatedly called attention to the enormous influx of Almeria grapes in the markets of Great Britain and the United States, and the consequent effect on the sale of the Cape product. Limited quantities of these grapes are grown in this Colony, and small shipments were made during 1906, but the export was discontinued on the ground that the cheapness of this variety would not warrant the expenditure upon shipment. It is advisable that further experiment be made with the shipment of this variety, which, on account of its hardy character, can be carried in ventilated holds, and whose keeping qualities enable it to be stored under ordinary conditions for long periods of time. The grape retains its good quality for many months, and the large quantities sent into Great Britain and the United States from Spain from August to November are in large measure stored up against the succeeding months, and therefore compete seriously with the poor qualities of Cape grapes. It is thought that if Almeria grapes could be shipped from the Cape in cases of the same size as the bushel boxes used for apples and arriving in London from the beginning of March to the end of April, they should command prices varying from 3d. to 6d. per lb. The sea freight being 25s. per ship ton instead of 55s., the total cost of marketing 25 lbs. of grapes would be 3s. At 3d. per lb., this would realise 6s. 3d., which gives a fair return to the exporter. The Department will be prepared to assist as far as possible any shippers who desire to experiment with Almeria grapes.

Oranges.—It has been demonstrated that this fruit will carry perfectly satisfactorily in ventilated holds, and shippers should therefore insert the words "Ventilated Hold" across the face of their consignment notes. The ocean freight for ventilated hold is 25s. per 40 cubic feet as against 55s. in cool chambers. Cheap boxes to hold about 100 oranges should be used, and the large grape box (24" x 18" x 5½") is considered suitable. No

wood wool should be used, each fruit should be wrapped in a piece of light paper (some fancy printing such as name, trade mark, or brand of the grower being recommended), and the fruits should be packed very tightly. Oranges should be kept in a cool but very dry place for a few days after being cut from the tree, and should be most carefully examined and graded, large fruit only being shipped and no over-ripe or injured packed. The Navel variety is particularly popular, and experimental shipments have fetched good prices.

Naartjes.—This fruit is now sold in England under its own name, and has become very popular. There is no necessity for cold storage in ocean transit, and the same rules apply as in the case of oranges with regard to packing and selection—*naartjes* may, however, with advantage be packed in trays or shallow boxes, those being nailed together in packages of three to five. The fruit must be large, well coloured, uniform size, and free from all blemish. The Cape *naartje* is decidedly superior in size, flavour and colour to similar fruit from Spain and the Mediterranean.

Pines.—The Cape pine is becoming very popular, and has established itself in the London market. Pines should be shipped in ventilated hold as in the case of oranges and *naartjes*, and should be of the largest size possible of the sorts recommended, should have full, well-developed crowns, and pines of the same size should be packed in the same box. Growers should produce Queen Pines as large as possible, which should not weigh less than 20 oz., be of a bright reddish colour, with a large fresh crown, and should be cut with about an inch of the stalk left on the fruit. The Smooth Cayenne or St. Michael variety should also be cultivated on a much larger scale. Pines should be packed in boxes in accordance with the size of the fruit shipped, one dozen in each box. The boxes should then be battened together in sets of three, with a centre division across the inside of each box to prevent the boxes above from bruising the fruit. It is not necessary to provide lids for the two lower boxes in the bundle thus formed. For packing wood wool or mealie cob leaves may be used, whatever is more convenient and economical; the wood wool need not be very fine, any fairly coarse quality is good enough. No grass must, however, be used for packing, as it is much too heating. If mealie cob leaves are used, it is necessary that the leaves should be shredded or torn up, and be quite dry and white. Large, unshredded leaves are not altogether suitable. As the fruit suffers from a considerable amount of shrinkage during the voyage, it must be tightly packed, but with as little wood wool as possible. The Giant Kew is not acceptable in European markets.

It is the intention of the Department of Agriculture, in consultation with the Union-Castle Steamship Company, and the Harbour Department authorities at Cape Town Docks, to carry out certain experiments during the forthcoming season with a view to the determination of the most suitable temperatures in which fruits may be carried packed by different methods and under varying conditions. No experimental work can, however, be of the slightest use to the Colony unless the fruit growers themselves are prepared to put their whole energies into the scheme.

It is, therefore, confidently hoped that fruit growers, and indeed every interest in the Colony concerned with the export of fruit, will give the most careful consideration to the various points raised in this Bulletin, and leave nothing undone to bring about that measure of prosperity in the Cape fruit trade which it undoubtedly merits, and which, with care and good management, it shall certainly achieve.

Shippers must make their own arrangements to secure packing material, and the Department of Agriculture will at all times be but too willing to consult with and advise those engaged in the export of fruit on any subject affecting their interests.

APPENDIX A.

The undermentioned are the minimum sizes of fruit which can be submitted for inspection as "extra selected," "selected," and "minimum grade" respectively. Owing to shrinkage, it is recommended that all fruits be graded $\frac{1}{8}$ inch larger than the sizes mentioned.

APPLES.

No minimum size is fixed, but the fruit must not be small.

Varieties ripening prior to Ribstone and Jonathan will not receive the Government brand.

PEACHES.

Variety.	Grades.		
	"Extra Selected."	"Selected."	"Minimum Grade."
All other varieties	2 $\frac{3}{4}$ inches.	2 $\frac{3}{8}$ inches.	2 $\frac{1}{8}$ inches.
Early Rivers	2 $\frac{1}{2}$ "	2 $\frac{1}{4}$ "	2 "

No variety of Clingstones shall be shipped.

Yellow-fleshed varieties shall be marked simply with variety and number of fruit in each box. Minimum grade 2 inches.

NECTARINES.

Variety.	Grades.		
	"Extra Selected."	"Selected."	"Minimum Grade."
All varieties	2 $\frac{1}{4}$ inches.	2 $\frac{1}{8}$ inches.	1 $\frac{7}{8}$ inches.

Early varieties shall not be shipped.

APRICOTS.

Variety.	Grades.		
	"Extra Selected."	"Selected."	"Minimum Grade."
All varieties	2 $\frac{1}{8}$ inches.	2 inches.	1 $\frac{3}{4}$ inches.

Clingstones shall not be shipped.

JAPANESE PLUMS.

Variety.	Grades.		
	"Extra Selected."	"Selected."	"Minimum Grade."
Satsuma... ..	2 $\frac{1}{4}$ inches.	2 inches.	1 $\frac{3}{4}$ inches.
Kelsey	2 $\frac{1}{8}$ "	2 $\frac{1}{8}$ "	2 "
Wickson... ..	2 $\frac{3}{8}$ "	2 $\frac{1}{8}$ "	1 $\frac{7}{8}$ "
Apple	2 $\frac{1}{4}$ "	2 "	1 $\frac{3}{4}$ "
Simoni	2 $\frac{1}{8}$ "	2 $\frac{1}{8}$ "	1 $\frac{7}{8}$ "
Chalcot... ..	2 $\frac{1}{4}$ "	2 "	1 $\frac{7}{8}$ "
Burbanks			2 "
Ogon... ..			1 $\frac{3}{4}$ "
Shiro			2 "

Burbanks, Ogon and Shire shall be marked simply with variety and number of fruit in each box.

Botans shall not be shipped.

DOMESTIC PLUMS.

Variety.	“ Extra Selected.”	Grades. “ Selected.”	“ Minimum Grade.”
All varieties...	1½ inches.	1¾ inches.	1¼ inches.

PEARS.

Variety.	“ Extra Selected.”	Grades. “ Selected.”	“ Minimum Grade.”
Bon Chrétien ...	3 inches.	2½ inches.	2¼ inches.
Comice ...	3 ..	2½ ..	2¼ ..
Louise Bonne ...	2¾ ..	2½ ..	2¼ ..
Beurré Bosc... ..	2¾ ..	2½ ..	2¼ ..
Winter Nelis ...	2¾ ..	2½ ..	2¼ ..
Beurré Hardy ...	2¾ ..	2½ ..	2¼ ..
Glout Morceau... ..	3½ ..	2½ ..	2¼ ..
D'Angoulême ...	3½ ..	3 ..	2½ ..
Clapp's Favourite ...	3½ ..	2½ ..	2½ ..
Easter ...	3½ ..	2½ ..	2¼ ..
Beurré Diel... ..	3½ ..	2½ ..	2¼ ..
Magnate ...	3 ..	2½ ..	2¼ ..
Gansel's Bergamotte ...	3 ..	2½ ..	2¼ ..
Josephine ...	2½ ..	2½ ..	2½ ..
White Doyenne... ..	2¾ ..	2½ ..	2¼ ..
Beurré Superfine ...	2¾ ..	2½ ..	2¼ ..
Forelle ...	2½ ..	..	2¼ ..
Fertility... ..	2½ ..	..	2¼ ..
Tongres ...	2½ ..	..	2¼ ..
Durandeau ...	2½ ..	..	2¼ ..
Le Comte ...	2½ ..	2¾ ..	2¼ ..
Flemish Beauty... ..	3 ..	2½ ..	2¼ ..
Rustenburg ...	3 ..	2½ ..	2¼ ..
*Capeaumonde ...	..	..	2¼ ..
*Kettler... ..	..	..	2¼ ..
*Pitmaston Duchess ...	..	..	2½ ..
*Cape Kalabas... ..	..	..	2½ ..
*Safraan... ..	..	..	2½ ..
*Souvenir du Congress ...	..	..	2½ ..
*Winkfield ...	..	..	2¼ ..
*Clairgeau ...	..	..	2¼ ..

For any variety not classified, minimum grade 2¼ inches.

The varieties known as December and Jargonelle shall not be shipped.

* To be marked simply with variety and number of fruits in each box.

APPENDIX B.

INSPECTION OF FRUIT FOR EXPORT—SEASON 1909-1910.

I (we), the undersigned, being about to ship fruit from this Colony to Europe during the forthcoming season (from the 1st December, 19 .., to 31st May, 19 ..) hereby undertake to select, grade and pack all such fruit in accordance with the instructions issued by the Department of Agriculture, and further agree to submit such fruit to the examination of the Government Fruit Inspector at Cape Town Docks, and to accept the decision of the said inspector as to the grade in which such fruit shall be

placed; and in the event of the fruit consigned by me (us) being declared by the said Inspector to be unfit for export, for any reason whatever, I (we) agree that such fruit shall not be shipped but shall be realised on my (our) behalf in Cape Town either (a) at the instance of the Department of Agriculture, or (b) through such agent as I (we) may appoint.

Address.....

Signature.....

Shipping Marks.....

Railway Station.....

Telegraphic Address.....

Date

Witness

APPENDIX C.

RECOMMENDATIONS FOR TRIAL SHIPMENT OF GRAPES IN CRATES.

No. "1" Crate.—Outside measurements, 29" x 16½" x 9½". Cost of crate, packed in shooks, F.O.B. London, 97s. per 100. Estimated freight, duty and landing charges, 33s. Total cost per 100, landed Cape Town, 130s. (or about 1s. 4d. each).

No. "1" Special Baskets, to fit the above crate (with handles) to hold 5 lbs. of grapes, 12s. per gross, F.O.B. London. Estimated freight, duty, etc., including margin of profit for importers, 10s. per gross. Total cost per gross at Cape Town, 22s.

No. "2" Crate.—Outside measurements, 25½" x 15½" x 10", to hold eight 4½ lbs. plaited chip baskets with handles. The cost of this crate and the baskets will be practically the same as No. "1" crate.

No. "3" Crate.—Outside measurements, 24" x 15½" x 10" to hold eight 4 to 4½ lb. chip baskets *without* handles. The total estimated cost of crates landed Cape Town is 1s. each. Cost of baskets for same, F.O.B. London, 11s. per gross, plus estimated freight, duty, etc., 6s., total 17s. per gross, Cape Town.

As a guide to shippers and for the purpose of comparing the cost of shipping by this method with the present method of packing, the following estimate has been made:—

	No. "1" crate to hold 40 lbs. grapes. s. d.	No. "2" crate to hold 36 lbs. grapes. s. d.	No. "3" crate to hold 32 lbs. grapes. s. d.
Cost of crate in Cape Town	1 4	1 4	1 0
Cost of 8 baskets in Cape Town ...	1 3	1 3	1 0
Cost of paper and nails	0 3	0 2	0 2
Railage and Dock Dues	0 8	0 8	0 6
Freight in cold storage in ship ...	3 11	3 4	2 10
Cost of labour on farm for putting up crates, packing, etc....	1 0	0 10	0 9
London charges, reckoned on a basis of about 10 per cent.	2 5	2 0	1 9
	10 10	9 7	8 0
Equal to	3¼d. lb.	3¼d. lb.	3d. lb.

The grapes shipped in boxes of 10 lbs. work out at 3d. per lb. delivered and sold in England. The estimates are on the same basis.

The baskets should be lined with white, transparent, grease-proof paper, and be covered with a single sheet of the same paper when full.

The baskets and crates might with advantage be got ready some time before it is necessary to cut the grapes, and when it is intended to commence packing, the crates with the empty baskets should be placed at convenient spots in the vineyard.

The packer should be supplied with a strong pair of grape clippers and a small sharp pair of thinning-out scissors. He will then cut the bunch from the vine with the former, hold it by the stem and pick out any over-ripe, damaged, or green and small berries. He will also trim the bunch so as to give it a nice shape. Each bunch of grapes should be laid in a single sheet of white sulphite paper of convenient size, not wrapped, and placed gently into its place in the basket. The grapes should not be touched by the hand. When the baskets are full a sheet of white transparent grease-proof paper is drawn over the top and fixed with a thin elastic band or piece of string: the former being more convenient. The basket should then be placed in its place in the crate. When the crate is full, the lid, which has already been stencilled with the required marks for shipment, should be nailed on. The full crates should then be forwarded without delay to the nearest railway station.

All crates should be clearly marked on the upper lid only with the following words:—

THIS SIDE UP.
HIGHLY PERISHABLE.
WITH GREAT CARE.

(and also the shippers' and consignees' marks.)

The Packer having first ascertained the weight of the crate and baskets when empty should then weigh the full crate, so as to ascertain the net weight of the contents. A card should then be nailed at the end of each crate, giving the name of the Shipper and Consignee, or Agent, the varieties of grapes and the net contents.

FRUIT EXPORT.

Return of Fruit Shipped from Cape Colony during November, 1909

Port of Shipment.	Destination.	No. of Packages.	Description of Fruit.	Quantities.	Value.
					£ s. d.
Port Elizabeth	England	24	Pines ...	1,680	7 10 0
Cape Town ...	German South West Africa	61	Apples ...	16,368	92 15 0
" ...	"	115	Oranges ...	17,948	62 7 0
" ...	"	25	Bananas ...	17,636	23 4 0
" ...	"	15	Naartjes ...	4,975	15 18 0
" ...	"	49	Pines ...	1,172	16 8 0
" ...	"	23	Lemons ...	3,050	12 5 0
" ...	"	2	Guavas ...	400	0 8 0
" ...	"	1	Cocoanuts ...	24	0 6 0

CAPE PRODUCE CONDEMNED IN THE TRANSVAAL.

Return of Vegetable Produce from Cape Colony condemned by Transvaal Plant
Inspectors at Johannesburg and elsewhere during the month of October, 1909 :—

POTATOES.

- Oct. 4. R. Smith, Burghersdorp, 10 bags, *Phytophthora infestans*, 5 per cent.
- .. 4.—Malcomess & Co., Cathcart, 200 bags, Eelworms and *Fusarium solani*, 3½ per cent.
- .. 4.—Malcomess & Co., Cathcart, 110 bags, *Fusarium solani*, 3½ per cent.
- .. 5.—G. Opperman, Ugie, 5 bags, Eelworms, 10 per cent.
- .. 6.—B. J. McQuirk, Queenstown, 45 bags, *Fusarium solani*, 10½ per cent.
- .. 8.—J. Lawrence & Co., Kimberley, 2 bags, *Phytophthora infestans*, 7 per cent.
- .. 12.—J. H. Stony, Kimberley, 1 box, Eelworms, 10 per cent.
- .. 12.—H. Schmidt & Co., Kimberley, 2 bags, Tuber Moth, 8 per cent.
- .. 13.—Barney, Ashton, 150 bags, Eelworms and *Fusarium solani*, 4 per cent.
- .. 13.—B. J. McQuirk, Queenstown, 15 bags, *Fusarium solani*, 10½ per cent.
- .. 13.—S. J. Fouché, Haleston, 50 bags, Eelworms and *Phytophthora infestans*, 3 per cent.
- .. 18.—A. J. Fouché, Haleston, 44 bags, Eelworms, 4 per cent.
- .. 18.—A. J. Fouché, Haleston, 36 bags, Eelworms, 6 per cent.
- .. 18.—McRennie & Co., Cathcart, 95 bags, *Nectria solani*, 5 per cent.
- .. 18.—S. J. Fouché, Haleston, 50 bags, Eelworms, 7 per cent.
- .. 20.—S. J. Fouché, Cathcart, 75 bags, *Fusarium solani*, 4 per cent.
- .. 21.—Brisk Bros., Ashton, 25 bags, *Fusarium solani*, 7 per cent.
- .. 21.—Heathlie Bros., Worcester, 20 bags, *Fusarium solani*, 7 per cent.
- .. 21.—Heathlie Bros., Worcester, 10 bags, *Fusarium solani*, 8 per cent.
- .. 21.—Blaine & Co., Port Elizabeth, 3 boxes, *Fusarium solani*, 6 per cent.
- .. 22.—P. J. Joubert, Ashton, 10 bags, *Fusarium solani*, 6 per cent.
- .. 27.—Malcomess & Co., Cathcart, 57 bags, Eelworms, 5 per cent.
- .. 27.—Malcomess & Co., Cathcart, 100 bags, *Fusarium solani*, 7 per cent.
- .. 28.—McRennie & Co., Cathcart, 59 bags, *Fusarium solani*, 5 per cent.

ORANGES.

- Oct. 2.—J. Ahamed, Grahamstown, 1 box, Red Scale, 12 per cent.
- .. 11.—Goods, Grahamstown, 4 boxes, Red Scale, 25 per cent.
- .. 16.—Peitosse, Buffelsjaagte, 1 box, Red Scale, 30 per cent.

LEMONS.

- Oct. 6.—S. Cotzias, Somerset West, 25 baskets, Red Scale, 25 per cent.
- .. 18.—Bathurst Farmers' Union, Grahamstown, 7 cases, Red Scale, 11 per cent.
- .. 29.—J. J. Booth, Grahamstown, 1 box, Citrus Rot, 25 per cent.

NAARTJES.

- Oct. 18.—Bathurst Farmers' Union, Grahamstown, 7 cases, Citrus Rot, 22 per cent.

TABULATED SUMMARY OF CAPE PRODUCE REJECTED BY THE TRANSVAAL ON ACCOUNT OF THE
ACCOMPANYING PESTS.

Article.	Disease.	Extent to which infected by Sample examined.										Sorted.		Destroyed.		Re-con- signed.		Total Rejected.	
		1 %		1 % to 2 %		2 % to 5 %		5 % to 10 %		Above 10 %									
		Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.		
October, 1909.																			
Potatoes	Eelworm	...	...	...	...	4	444	5	149	...	...	8	592	...	...	1	1	9	593
	Phytophthora infestans	...	...	...	...	1	10 50*	1	2	...	...	1	10	...	...	1	2	2	12
	Fusarium Solani	...	...	...	...	2	185 350*	9	337	1	45	9	519	...	...	3	48	12	567
	Tuber Moth	...	...	...	...	...	...	1	2	...	...	...	...	...	...	1	2	1	2
Oranges	Red Scale	...	...	...	...	...	...	...	...	3	6	...	...	2	2	1	4	3	6
Lemons...	Citrus Rot	...	...	...	...	...	...	...	...	1	1	...	...	1	1	...	...	1	1
	Red Scale	...	...	...	...	...	...	...	...	2	32	...	...	...	...	2	32	2	32
Naartjes	Citrus Rot	...	...	...	...	...	...	...	...	1	7	...	...	...	...	1	7	1	7
Total for October, 1909 ...		...	...	...	...	7	639	16	490	8	91	18	1,121	3	3	10	96	31	1,220

* Also listed under Eelworms, and therefore not included in total.

MISCIBLE OILS FOR SPRAYING.

By CHAS. P. LOUNSBURY, Government Entomologist.

This note is to direct attention in this country to the comparatively new class of insecticides for the destruction of scale insects. These insecticides are closely related to paraffin and other petroleum oil emulsions with soap, such as have long been used, but they are a very great improvement over those substances inasmuch as they are equally as easy to mix and as pleasant to apply while they are most decidedly more efficacious in destroying scale insects. Several proprietary preparations of the class have been sold in the eastern United States for four or five years, and their success has been such that they are becoming widely imitated in "home-made" preparations. The basis of all is more or less refined petroleum,-- that is the mineral oil from which paraffin oil, petrol, and other common burning oils are extracted. With the mineral oil a definite proportion of certain vegetable (usually resin) or of fish oils and other ingredients is carefully blended with the result of producing a dark coloured liquid that will mix readily and uniformly with cold water. A dilution in water is milk-white and resembles a dilution of a coal-tar sheep dip or of ordinary paraffin emulsion. The preparation is in fact an oil emulsion, but one superior to an ordinary soap emulsion in that its particles of oil are a great deal smaller. The oil, indeed, is in large part in such an extremely finely divided state that it is doubtful if all the particles would be visible through any ordinary microscope. The fine particles are able to penetrate and to bring about the death of scale insects which are little affected by the far coarser particles of an ordinary emulsion. The claim is sometimes made that part of the oil is actually dissolved in the water, and hence the name "soluble oils" by which these preparations are sometimes called. More properly the preparations are called "miscible oils," as they mix freely and well and show no tendency to separate from water under ordinary conditions.

Since the success of a few proprietary miscible oils became apparent, several of the American agricultural experiment stations have devoted a great deal of study to the preparation of such substances, and have put the public in possession of formulas and detailed directions for compounding stock solutions at home. The idea, of course, is to enable the farmer to get preparations of the kind for his own use at the lowest possible cost. American authorities, however, disagree as to the economy of preparing stock solutions of the kind on the farm, particularly in small quantities, and as in any case the chief ingredients are practically unobtainable in South Africa, it is not proposed to quote the particulars in regard to blending them in this article. Instead, it is desired to invite public attention to the fact that one of the American proprietary preparations is now procurable in the country. When farmers are satisfied that this or a similar article is fulfilling a real need, it will be time enough to consider the question of home-made imitations.

SCALECIDE.

The proprietary preparation alluded to is Scalecide, the credit for introducing and pushing which is due to Messrs. J. E. Jelks and Co., Exchange Place, Cape Town. Scalecide is advertised as the oldest and largest used of the miscible oil spraying preparations and the writer believes this claim to be true. Moreover to judge from the statements made in official American experiment station publications it is not excelled in efficiency by any preparation of its kind, and the high standard of reliability it gained in the first year of its use appears to have been steadily maintained. It is manufactured by the B. G. Pratt Company of New York City. The exact formula used in making it, and the details of the blending, are trade secrets, but the essential constituent is acknowledged to be petroleum. According to a statement made by the manufacturer and published in the 1907 annual report of the New Jersey Experiment Station, the mixture consists of 75 parts of a special grade of this oil together with 25 parts of combined vegetable oils and 8 to 10 parts of water and chemicals. Elsewhere the maker characterizes it as a "petroleum oil soap."

EFFICACY AGAINST SCALE INSECTS.

The scale insect killing power of Scalecide depends, of course, upon the extent to which it is diluted with water. The makers recommend a dilution of one part of the mixture to fifteen parts of water, and this strength is reported by some American experiment station experimenters to kill every scale wetted by it. It is probable that with very thorough, heavy spraying a more dilute mixture would be equally satisfactory in this climate. A recent Missouri Experiment Station Bulletin (No. 18) recommends a dilution of one part in twenty if the spraying is to be very thorough. Some experimenters elsewhere, however, report that it is desirable to use one part to ten of water for ordinary work. Its killing power appears to be much more than double that of ordinary paraffin emulsion, and the only spraying compound which American experimenters appear to think ranks alongside it and other miscible oils is the well known lime-sulphur wash. Some experimenters report lime-sulphur to give slightly better results, and some the miscible oils. The latter probably give uniformly better results when applied with equal thoroughness. For South African use, the writer thinks the miscible oils will prove the more reliable in action and therefore, in the long run, the more efficacious although in a single test the result with lime-sulphur might appear to leave nothing to be desired. It is a great point in favour of the oil that it kills within a day or two. Lime-sulphur, on the other hand, kills off the pest largely by its action on the young insects of the generation following the one to which it is applied; and occasionally, possibly owing largely to atmospheric conditions at the time they are settling, a great many of the young escape its effect however careful the application. This uncertainty of action appears to be particularly marked in the case of Red Scale on pear trees.

Owing to its oily nature, Scalecide wets the bark easily, in which respect also it is superior to lime-sulphur. But it will not, of course, affect scales that it does not actually reach, and hence one should always be particular to have the spraying done very thoroughly. The wash gives the trees a greasy look for a short time but parts that are missed are not easily detected. A very fine spray suffices for good work but it should be applied with heavy pressure—over 100 pounds if possible. A coarse spray is wasteful of a wash of this kind. It is best to spray in clear weather when there seems no prospect of rain within a few days.

Another respect in which Scalecide and similar preparations is better than lime-sulphur is their non-corrosiveness to the metals of the spraying apparatus and their harmlessness to the skin. Further as they are completely without solids in suspension they exert the minimum of wear on the pump. Like all mineral oil preparations, however, Scalecide is injurious to rubber and hence hose pipes used with it have short life unless carefully looked after. The best quality of hose should be used and care taken to empty it as soon as spraying ceases.

In America, Scalecide is chiefly used against San Jose Scale, which is a near relative of our Red Scale. In this country, its chief use would be against Red Scale and White Peach Scale, for both of which insects, as will be shown later, it appears thoroughly effective at the strength of one part to fifteen of water. It is likely to be equally effective against any of the other common scales of fruit trees.

SAFETY TO TREES.

Primarily, Scalecide is designed for use on deciduous trees while they are out of foliage, and for such use it is claimed that it is perfectly safe as regards the trees when used as recommended. On this point, the Entomologist of the New Jersey Experiment Station in his 1906 annual report states:—

The petroleum which is used is of a brown colour, not unlike the usual appearance of ordinary crude, but it lacks the light gasolines or naphthas, and is practically free from vaseline. In its raw state it is therefore not nearly so diffuse as undiluted crude, and, on the other hand, it leaves no penetrating greasy residue of vaseline or paraffine to work into the plant cells. The vegetable oils dry out before they soak in, but they have a tendency to bring the scales into close contact with the bark, and the scurf may remain for an entire season, sometimes giving the trees the appearance of being badly infested when not a living specimen can be found. At other times the bark may clean up completely, leaving little or no scurf remaining. As the material is completely soluble, all traces of actual combined oil will be washed from the trees. It is almost impossible to injure a dormant tree with Scalecide diluted in any reasonable way, and successive applications do not produce a cumulative effect, because no residue remains to accumulate.

In his 1907 annual report, the same entomologist reiterates his statement that trees are not injured. He says:—

A long enough series of years has now elapsed to make it safe to say that no harm is caused to trees of any kind by repeated applications of soluble oils, and that they may be safely used as often as may be needed. Nothing remains of the bark that cannot be either evaporated or washed away, and there seems to be no penetration through the outer bark and into the bast tissue.

It should be remembered by users of the preparation, however, that they are dealing with an article made up largely of an oil that might prove very injurious to their trees in its free state. Therefore the precaution to stir the stock solution thoroughly before adding it to the bulk of water should be carefully observed, and the stock solution should be added to the water—not the water to the stock solution. There is a small proportion of water in the stock solution and it is necessary that this be present in order to get a good mixture with a bulk of water. If this original water were diminished by evaporation, as might be the case with goods in wooden barrels that have come through the tropics and stood for some months, water to make good the loss should be added. If an addition is necessary, the stock solution will not mix readily with a bulk of water. In that case water should be added to the stock solution little by little, stirring meanwhile, until the brown colour begins to give place to a creamy one.

In general there seems to be no danger of injuring a deciduous tree by winter spraying, and as will be noted below the injury to most plants sprayed in foliage is not likely to be really serious. The spraying may be done at any time during the dormant season. The only caution with regard to treating deciduous trees in winter which the writer has to make is with respect to peach and nectarine trees. It appears to be the experience in America that these trees are not injured, but until whether they are or not has been amply demonstrated in this country the cautious fruit grower will treat only the less valuable of his trees of these kinds, for they are very sensitive to oils. The only peach trees which the writer knows to have been treated at the Cape so far are a couple in a Constantia orchard. The scale troubling them was practically if not entirely eradicated and the trees are in splendid foliage now, but they bear very few fruits and it much looks as if the spraying were the cause. Unfortunately the surrounding trees are of other varieties; they bear good crops. The danger of spraying peach trees, if danger there really is, is probably less in the early spring than in the autumn and early winter. The Constantia trees were treated in June.

A number of Louis Bonne and Kieffer pears that had been treated by a well known fruit grower with a one to fifteen mixture during the past winter were recently seen by the writer. The trees were bearing heavy crops of fruit and appeared to have been quite cleaned from the Red Scale and Bryobia Mite with which they had been infested. This grower had been troubled by Red Scale in these trees for many years, and in successive winters had sprayed thoroughly with lime-sulphur-salt, resin wash, and very strong paraffin emulsion without succeeding in mastering the pest. He is charmed with the apparent clean riddance made by Scalecide and has booked a substantial order for the coming winter's spraying. Trees in the same pear orchard treated last winter with strong paraffin emulsion are still much infested with living Red Scale.

To test the action of the wash on plants in foliage, the writer sprayed a variety of plants on a clear day late in November. Some were done with one to fifteen of water, and some with one to twenty-five. A branch of peach treated with the stronger mixture soon shed its leaves and fruit and the young wood, if not the whole branch, has since died. A small apple tree, much infested with Red Scale, sprayed with the same strength, looked much injured for a few days. Small black spots formed on the fruit, the leaves spotted and dried out in places, and some leaves fell. In a month, however, the spots were being shed from the fruit and so much new foliage had been put out that the injury was hardly to be noticed, and there did not seem to be a single surviving scale insect. An infested unsprayed tree close by that looked the better of the two at the time of spraying now looks decidedly the worse. Two rose bushes sprayed with the same strength behaved similarly; most of the old foliage was shed, but the scale was all killed and new growth quickly made an appearance. Even a geranium plant soon replaced its lost foliage and seemed little the worse. The foliage of grape vines was much scorched but few leaves fell; the weaker strength was injurious in the same way but not to the same extent. Foliage of oak, pepper tree, macrocarpa, and cornuta eucalyptus was scorched somewhat by both strengths. A small orange tree was sprayed with each strength. In both cases there was a loss of a great deal of old foliage, somewhat under half in the case of the weaker strength and considerably over half in the case of the stronger, but new growth is being put out and it is expected that the trees will both recover quickly.

Citrus trees have been sprayed with Scalecide at two other Cape places, and have been seen since by the writer. At Tokai about a dozen orange trees were done with the one to fifteen strength in early August,

and a few oranges and naartjes in Drakenstein in late November. The riddance of scale was by no means complete at either place, but this fact was seen to be due to faulty spraying. At both places considerable foliage was lost, but the parties in charge did not consider the damage at all serious. Three trees at Tokai that were in new growth at the time and which were rather heavily sprayed, were burned more than the others and still showed the damage by many dead and many leafless twigs even after three and a half months. Unfortunately there seems to be very little American experience to indicate how citrous trees stand the wash. Official publications at hand are all silent on the matter, and the very few testimonials published by the makers that mention its use on trees of this kind are altogether too vague to be of use. The preparation is made and chiefly sold many hundreds of miles from any citrous area. If experience at the Cape proves that it is reasonably safe to spray citrous trees, it is probable that far more of the preparation will be used on them than on deciduous trees. As matters now stand, the writer only cares to suggest its use on citrous trees when Red or Purple or other hard scale infests them very badly and fumigation is impracticable and the use of a drastic wash therefore justifiable. The treatment should then be very thorough indeed with the idea of wetting both sides of every leaf and the entire bark surface. It is just possible that the wash which runs down the trunk might injure the bark at the ground level and it would therefore be a wise precaution to scrape away the soil at that place if it becomes saturated. If there is doubt about the whole surface having been reached, the treatment might well be repeated after ten days or a fortnight. Of course, a time should be chosen for the treatment when the tree is not in active growth. A few weeks after the treatment the dead wood should be cut out.

FUNGICIDAL ACTION.

As is to be expected of any preparation of its kind, Scalecide possesses some fungicidal action. This property is very well displayed in the case of the leaf curl disease of peach and nectarine trees. Numerous observations to this effect have been made in America. The disease was particularly severe in the Cape Peninsula this season, but the few peach trees treated with Scalecide at Constantia were practically exempt from it. It showed much worse on lime-sulphur sprayed trees alongside. If the preparation proves safe for use on peach trees, as the writer most sincerely hopes it will, the common White Peach Scale and Leaf Curl will be less of a dread to the small orchardist and gentleman gardener. They will have at their command a reliable prepared wash, than which none is easier to dilute and apply, that will be effective for both troubles when applied in the winter. To what extent Scalecide checks other fungous troubles than Leaf Curl seems not yet to have been recorded.

CORRESPONDENCE.

The Making of Charcoal.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—From a Swedish farm assistant I got information which led me to construct a pit in which to burn charcoal for my suction gas engine. The results have proved so extraordinarily good that I wish to give other users, or prospective users, of these engines the benefit of my experience.

The pit is masoned up like a great circular oven, large at bottom and small at top, with a wheel-barrow door at bottom for emptying out the charcoal.

The dimensions of the pit are 11 feet deep, 8 feet bottom diameter, and 5 feet top diameter. When starting to burn, the wheel-barrow door is sealed with a sheet of zinc and ground, a fire is lit and thrown into the pit, and fine stuff after it. In ten minutes a roaring blaze is in full swing, and four or five big wagon loads of branches, willow stumps, etc., in fact anything in the shape of dry wood, is packed into the pit as fast as four men can do the work. This process usually takes about 4 hours then three sheets of zinc and a covering of sand smother the whole mass, which on opening is found to be first-class charcoal, and drives my engine for weeks. The great advantages I claim in this plan are the perfect simplicity of throwing four wagon loads of wood, any shape, almost any size, and any kind, and anyhow into a pit; also the fact that no wood of any kind need be wasted. An old "tacken" kraal, for instance, would be first-class material for the purpose.

To anybody inclined to doubt, I should say come to Horse Shoe and see the whole affair in full work.

Hoping that you will insert the above for the benefit of charcoal users. Yours, etc.,

J. F. PARKES.

Horse Shoe, Bethulie, December 15th.

Geel Dikkop in Sheep.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Will you kindly insert the following cure in your valuable Journal:—A cure for Geel Dikkop in Sheep. The dikkop that I mean is that in which the sheep's ears, lips and eyelids swell to a tremendous size, and if you give the swollen parts a cut with a sharp knife a yellowish fluid comes out. The first treatment is to cut the ears along the top and squeeze out as much of the fluid as possible; apply turpentine on all the affected parts, taking care that none goes into the sheep's eyes, as it is very painful, but should it go into the eye it will not be detrimental to the animal. For sheep badly infected repeat the dressing the following day, and it will not require any more attention. I have used the above cure on very badly infected sheep, and I have not had to repeat the dressing more than twice. Yours, etc.,

E. GRAY.

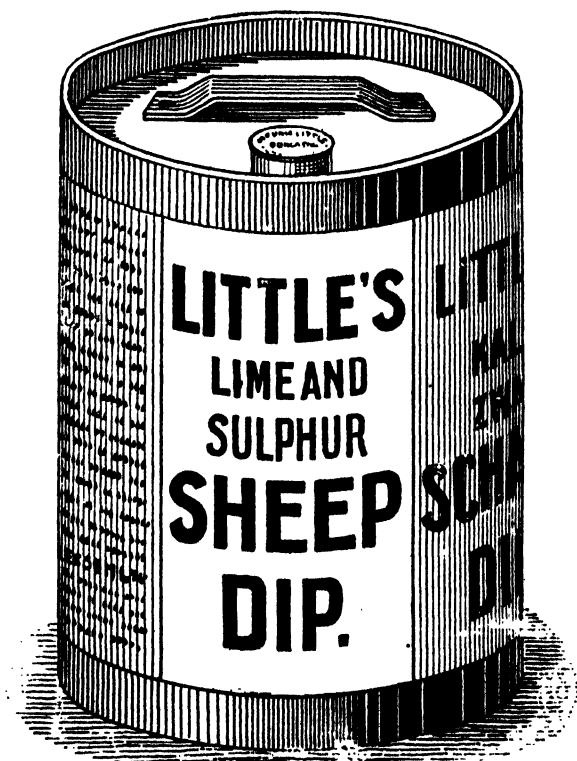
Elliot, December 13th.

Prickly Pear as a Pest.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—The question of how to cope with the Prickly Pear Pest is a matter that is continually receiving attention in the South African Press, and we therefore venture to address you on the subject, believing that what we have to say will prove of interest to many of your readers.

SCAB



A CERTAIN CURE.

MANUFACTURED BY

MORRIS LITTLE & SON (F & C) Ltd.

PORT ELIZABETH.

South Africa is not, of course, the only country cursed with the Prickly Pear, and we thought it might prove of interest and possibly of assistance to some of your readers, who may be unaware of the fact, to know that Cooper's Dip is a recognised means of coping with the Pear when only isolated plants or small patches have to be dealt with. That your readers may have the benefit of previous experience on this point, we quote below extracts from two of the many letters we have received from men who have successfully used Cooper's Dip to cope with the Pear:—

"We have been using Cooper's Powder for some time for destroying Prickly Pear, and have found it a great success. We have only scattered Pear on this place, and simply make a cut in the leaf, and put as much powder as would lie on a threepenny piece into the cut, using a pocket knife, and have not known it to fail."

"The Dip (Cooper's) has been successfully used for the destruction of this pest, it being applied as follows:—Cut a small piece off the highest branch of the Pear and insert a teaspoonful of the Powder (in dry form) into the standing plant where the cut is made. The Dip works right through the plant and down to the roots, rotting it away. The writer is of opinion that the Dip would destroy the pear if, by the use of a brush hook, the tops of the plants were cut off, and the Dip applied by means of a spray at a strength of one packet to ten gallons of water."

Trusting that the information contained in these extracts may prove of assistance to some of the many who have to fight the Prickly Pear.—Yours, etc.,

WILLIAM COOPER & NEPHEWS,

per S. J. MESSINA.

East London, December 18th, 1909.

A Complex Question.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—Much of interest and instruction have I read in your most valuable *Journal* during the last few years, but I don't think I have ever read anything on "The Changing of the Colour of Foals as they grow older."

Perhaps a letter in your *Journal* by one of our experienced horse-breeders would be interesting to many. It would be especially so to me just now, and may be, you yourself, Mr. Editor, or some kind reader of your *Journal* will come to my rescue. In October, 1908, a filly was born: I named it Sweetheart at first sight—a perfect little creature. It was kept at home for six weeks and then sent to the veld to run with other brood mares and foals; colour, dirty black, narrow white blaze on forehead, white stocking left hind leg.

Seven months later the mares were brought home, and this particular filly had lost its white stocking, while blaze became a small star; colour, dark bay, with black points. Is it the same foal? Or has someone swapped my Sweetheart.

Is there any scientific way of proving this to be the same foal or not, the dam and sire being known?—Yours, etc.,

C. H. HAYNES.

Perie, December 20th.

The Fertilization of Turkeys—An Exploded Idea.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—In the October issue of 1908 Mr. J. A. de Wet relates a circumstance of a turkey's eggs proving fertile after having done away with his cocks about two months previously, and in the December issue of the same year Poultryman says "It is not generally known that in the case of turkeys one act of coition is sufficient to fertilise the eggs for the whole season."

As I have bred poultry for the last 20 years, I thought this an extraordinary idea, and which I have never heard put forward by a poultryman before. I therefore decided to put the matter to a test.

In August last I had four turkey hens, but no cock, so I borrowed one from my neighbour. This cock mated the four hens, which started laying in September. As soon as they finished laying I returned the cock. These four hens hatched out 40 chicks, and started laying again in November. I allowed two hens to sit on 25

eggs for 10 days, when I broke the lot and found just as I expected, not one fertile egg. I would therefore advise "Poultryman" not to put his idea in practice unless it is to prove that I am correct.—Yours, etc..

G. W. TURPIN.

Woodridge, Dohne, 15th December, 1909.

Paspalum Dilatatum.

To the Editor, AGRICULTURAL JOURNAL.

SIR, I am not writing to contradict one word your Klein Drakenstein correspondent, "A. H. S.," has said about Paspalum, but to show him and your many readers that my experience of the grass is quite the reverse to his.

I will first tell "A. H. S." that I hold no brief for sellers of Paspalum plants neither am I one of those who sow a small bed and keep it watered and then report how splendidly it does; but, Sir, I will tell you that it is in my humble opinion the best grass for summer use I know of. Since September 15th this year I have had three good cuttings, and in a fortnight I can cut again, and this, without irrigation, on sand. The first cutting stood 5 feet 3 inches high, the second and third, 3 feet 6 inches. On one piece of land the plants were planted 1 foot between the rows, another piece 2 feet both ways; the whole ground is now covered like a mat, and there is a fine field now at Xmas, and will be until the winter comes, when it lies dormant until the following August.

I quite agree with "A. H. S." that Paspalum is good feed for stock, and I am sure if it was such a success with him as it is here he would not wish to trouble about fodder for the cattle. No doubt the conditions of the soil at Klein Drakenstein are different from mine. Many people have seen this (practical farmers some of them) and all call it a splendid grass, and if "A. H. S." is near here I shall be pleased if he would call and see for himself.—Yours, etc..

E. GOLDSMITH.

Newlands, December 25th, 1909.

Sheep Dips.

To the Editor, AGRICULTURAL JOURNAL.

SIR, I notice in December *Journal* a letter from Mr. C. P. de Villiers *re* dipping tanks. For some years as sheep inspector I have used different kinds of tanks, and must say that I find the circular one by far the best, with pillar in the centre, as the sheep have a continual swim and cannot hurt one another at all, and are not knocked about by pulling backwards and forwards, as in the long tanks. I have lately had two tanks built according to my own idea—one on Blenhiem, Mr. Peter's farm, and another on Mr. Dersley's Doornboom; both of these gentlemen are perfectly satisfied with result. I have dipped in both of these tanks, and find that they are most convenient and act splendidly. I enclose you specification of same, and should any of your readers fancy such a dip they are most welcome to same. Hoping enclosed will be of some use.—Yours, etc.,

ALBERT E. BATTERSON,
Sheep Inspector.

Sterkstroom, December 27th.

Dam Building—A Peculiar Experience.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—A dam was completed on my farm in April, 1909. It crossed a dry spruit, the wall being here 65 feet at the base and 19 feet high. Part of the foundation here was found to be washed sand and pebbles. This was all removed until an apparently solid clay bottom was reached. There was a small rain in May which allowed of

sufficient water to keep the base of the dam wet for about 20 yards. In September there was a good rain, which filled the dam to within 3 feet of the outlet. Within 24 hours of the stopping of the rain the dam broke in the spruit. No leak had previously been noticed, but no one had been across the wall for at least 15 hours before the accident. On refilling the gap a month later, the contractor found that after working a few hours the oxen were sinking up to their bellies in what had previously been dry ground. There was then very little doubt that there must be water below the foundation of the dam. On a hole being sunk, water was found about a foot deeper than the original foundation had been sunk to. The water is in a hard gravel (gruis), and is on a level with a permanent water-hole about 25 yards lower down the spruit.

The dam was built in a wet season, and was well tramped by two spans of oxen with scrapers. The stoning was well done.

I have done nothing further, and would like to hear suggestions from any of your readers who may have had a similar experience. If your expert could assist me I should be more than obliged. My chief difficulty seems to me to lie in the fact that there is practically no fall below the dam for at least 200 yards, rendering the draining of the water a difficult matter.—Yours, etc.,

FARMER.

Westminster, O.R.C., December 27th, 1909.

The Poison Controversy.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—So much being written and spoken about the inefficacy of the strychnine supplied by the Government (or rather purple poison), I would like to communicate some of my experiences with this poison to your readers.

We, in this part of the Colony, have to fight a good deal against various kinds of vermin, and we find this purple strychnine very efficacious.

Mr. M. P. Claase, of Blikfontein, in this district, put down poison for jackals: he killed two, which were found at a distance of about 60 yards from where the bait had been placed. He had those two jackals flayed. The following morning one of the Kafir dogs was seen eating of one of these jackals and afterwards found dead, about 30 yards from the jackal. Mr. M. P. Claase, seeing that those dead jackals were as poisonous a bait as freshly made poison pills, he had them burned; but the dead dog was left lying; the following day another dog was seen eating the dead dog; this dog was kept under observation with a view of seeing what would become of it; the result was that it walked about a distance of 800 yards, when it died.

Mr. H. Fraser, of Frasersdale, also of this district, put down one poisoned pill for the jackals; the following morning he found that "Mr. Fox" had taken it, and that he was lying dead at a distance of only 40 yards. Mr. Fraser was certain that the jackal had swallowed the whole of it and that nothing had been lost of it; he had the jackal skinned. The following day he had occasion to go the same way, when he got another dead jackal; he followed up the spoor of this one to the carcass of the first one, a distance of about 100 yards, and there it was evident that he had eaten of the carcass.

One night I put down 5 small pieces of poisoned liver, and the following morning I found four dead jackals, some of which were not further from the place, where they had picked up the bait, than 6 yards. A witness to this is Mr. F. J. Lock, of Tulbagh, C.C., for he had come the same way that morning.

I have also found that a jackal picked up a liver-pill, bit in it, threw it down, and died at a distance of 47 yards.

I have always made use of liver as a bait, because the poison, in my opinion, takes sooner effect when it has been put into liver. I always take fresh liver of a slaughter sheep and make pills of it about 2 ounces in weight, make a deep cut in it, and put poison into it, to the amount of as much as goes on a point of a pocket knife.

In that way I have killed 34 jackals, during August and September ultimo; I have not always found them at once, for some go a good distance, mostly when their stomach is full before they pick up the poison. To prove that, a dog of Mr. H. J. van Niekerk's picked up poison on my farm prepared as for jackals; that dog walked a distance of 5,100 yards before it died, when the poison took effect the death followed immediately. That dog had always been well fed, and its stomach had always been well filled.

Shortly, we in these parts use all strychnine, which we buy at the Magistrate's Office at 2s. 6d. per oz., and none of us have any complaint. But from experience I know that poison, put in meat, fat or other bait, particularly large bait, takes very slow effect.

I have also used Perchloride of Mercury and Potassium Cyanide, mixed together, for the purpose of poisoning jackals, and found it very efficacious.

As an antidote against strychnine I make use of common salt, dry, put in the mouth of the animal, and a little water afterwards; if the animal is still able to swallow, it will not die of the poison.—Yours, etc.,

JOHANNES J. CLAASE.

Middelput, P.O. Koopmansfontein,
District Barkly East, 12th December, 1909.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the November issue of the *Journal* I notice a communication of Mr. C. L. Nel, Bultfontein, P.O. Dassiesdorp, District Cradock, about the red poison, which all of us buy at the Magistrate's Office at 2s. 6d. Mr. Nel has always been so fortunate as to get good strychnine. If any man can speak from experience, I can do so myself, for here in Namaqualand there is always war against the sheep-thief. And when I say that I have bought 20 bottles of poison I don't say too much, and amongst those there was good poison and bad poison. If I put the good poison in carcasses the jackals will die; but if one puts the bad poison even in fat, etc., the jackal will not die. In the offices here there are two kinds of this red poison; the one is fine and the other coarse; the first is good, the other not. My farm is to a great extent sandy soil. I trace the spoor of the robber for miles, but I am sure that, although the poison affects him somewhat, he may fall down, but gets up again and starts catching mice. I think Mr. Visagie was perfectly right; and not only I, but many others have had the same experience. In September the herd lost a lot of ewes and lambs, that same night the jackal killed 6 lambs and 3 ewes. The worst of it all is that, once a jackal has picked up poison and has felt its effect without it killing him, he will never afterwards pick it up again.—Yours, etc.,

P. J. VAN ZIJL.

Meidjeskarroo, District Port Nolloth.

Tortoises and Mud Fish.

To the Editor, AGRICULTURAL JOURNAL

SIR,—I notice in the issue of November that Mr. N. C. Musto is surprised that Mr. Turner does not know where tortoises go during drought; but I am very much surprised that Mr. N. C. Musto says that fishes also bury in the mud, because I am sure that a fish dies as soon as the water dries up. Whatever is right must remain right.—Yours, etc.,

W. S. TURNER.

Thabies, Gerdonia, 27th December, 1909.

Wanted—Norfolk Lurchers.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I find in the *Agricultural Journal* a communication of Mr. Chas. Marais that the farmers of the districts of Heidelberg, Bredasdorp and Swellendam own such good dogs, viz., the Norfolk lurcher, crossed with the foxhound, and that these dogs are employed in catching and killing vermin, like jackals, and all kinds of cats. Would anyone in one of those districts be good enough to inform me by letter where such dogs (young ones) are to be had, and at what rate I might get them, forwarded to Prieska station.—Yours, etc.,

T. G. DE KLERK.

Hartebeestvlakte, P.O. Upington, C.C.

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 for treatment of Biliary Fever in Dogs, see page 582 of
 the November number of the "Agricultural Journal."

We put this preparation in tubes containing an
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After filtering, the Solution is ready for injection.

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For—

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For—

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NOTES ON THE WEATHER OF NOVEMBER, 1909.

By CHARLES M. STEWART, B.Sc., Secretary to the Meteorological Commission.

Mean atmospheric pressure slightly above the normal; warm days and cool nights, with a mean temperature a little above the average; cloudy skies, a moderate frequency of fogs; southerly winds in the West, westerly in the East; a few light frosts; some wide-spread thunderstorms, but less frequent than usual; a mean rainfall of less than half the usual depth; such were the more prominent features of the weather of November, 1909.

DIVISION.	Mean Rainfall (1909).	Mean No. of Days.	Average Rainfall (1891- 1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ...	0·81	6	1·57	6	-0·76	- 48
South-West ...	0·56	3	0·94	4	-0·38	- 40
West Coast ...	0·30	2	0·32	2	-0·02	- 6
South Coast ...	1·27	6	2·57	7	- 1·30	- 51
Southern Karoo ...	0·28	2	1·10	3	-0·82	- 75
West Central Karoo ...	0·43	1	1·04	2	-0·61	- 59
East Central Karoo ...	0·33	2	1·36	3	-1·03	- 76
Northern Karoo ...	0·28	2	1·27	3	-0·99	- 78
Northern Border ...	0·37	2	1·22	4	-0·85	- 70
South-East ...	1·51	4	3·25	7	-1·74	- 54
North-East ...	1·04	4	2·52	6	-1·48	- 59
Kaffraria ...	2·85	9	3·31	8	-0·46	- 14
Basutoland ...	2·84	8	3·21	8	-0·37	- 12
Durban (Natal) ...	4·19	16	5·00	...	-0·81	- 16
Bechuanaland ...	0·87	6	2·29	6	-1·42	- 62
Rhodesia ...	1·26	5	3·61	11	-2·35	- 65

Precipitation during November amounted on the mean of 365 stations, to only 1·07 ins. on 4 days, being 1·34 ins., or 56 per cent., less than the normal. This amount is 0·53 ins. less than the mean for the corresponding month of 1908, and 0·47 ins. less than during October last. That this deficiency in the rainfall was practically common to the whole country may be easily seen from the accompanying table of sectional rainfall, in which it is shown that a deficit of 50—75 per cent. or more occurred over ten of the sixteen divisions, and varied between 6 per cent. over the West Coast, and 78 per cent. over the Northern Karoo. The only divisions having means exceeding one inch were North-East, Rhodesia, South Coast, South-East, Basutoland and Kaffraria, whilst Durban (Natal) had a total of 4·19 ins. for the month, the result being an exceptionally dry state of the country, causing considerable loss of crops, with a cessation of ploughing operations in some districts. Although only 21 stations out of 365 reported "absolute drought" throughout the month, an additional 128 suffered from partial drought, having only 0·01—0·50 ins. as their totals; of the remainder, 74 had 0·51—1·00 ins.; 85 had 1·01—2·00 ins.; 37 had 2·01—3·00 ins. 9 had 3·01—4·00 ins.; 7 had 4·01—5 ins.; leaving the following four (4) with more than 5 inches:—Bazeya (5·13 ins.); Qacha's Nek (Basutoland), 5·48 ins.; Evelyn Valley (6·16 ins.); and Port St. John's, 7·86 ins. Similarly, it is found from a scrutiny of the daily maximum amounts recorded, that the totals recorded in 24 hours were nowhere very large, only three (3) having 2 inches and upwards, and of these the 2·85 ins. at Qacha's Nek on the 17th was the largest. Of the remaining 352 stations, 218 had nil to 0·50 ins.; 95 had 0·51—1·00 ins.; and 39 had 1·01—2 ins. Although 275 instances of *Thunderstorms* were reported as occurring on 21 days of

the month, these were mostly of a local character, except on 3rd, 17th, 29th and 30th, more particularly on the last day of the month, when a large proportion of the stations was affected. *Hail* was noted at 12 stations on 5 days, principally 3rd and 17th, but no damage seems to have been caused by these storms. No *Snow* or *Sleet* occurred during the month at any of the stations.

Temperature, Cloud, and Wind.—The mean temperature for the month of all the stations was 64.7° , being 1.7° higher than during November, 1908, and 4.6° above the mean for October last. The mean of the day temperature (76.3°) was 5.6° higher than during the preceding month, and 2.4° above the value for the corresponding month of the previous year; whilst, similarly, the mean of the night temperatures (53.2°) was 3.5° and 1.0° respectively above the means for these same months. The mean daily range of 23.1° is 2.1° more than that for last month, and 1.4° more than in October, 1908. On instituting a comparison with the normals, it is found that the monthly temperature is 0.3° higher than usual, the mean maxima being 1.4° above, but the mean minima 0.8° below, the corresponding averages. The day temperatures at the separate stations were mostly above the normal, by amounts ranging from 6.8° at Port Nolloth to 0.0° at East London, and mostly by 2.4 degrees in the South-West and inland. In Kaffraria, however, and at a few stations in the South as well as at Hopefontein the mean maxima were lower than usual by amounts varying from 0.2° at Amalienstein to 3.0° at Port St. John's. On the other hand, the mean minima were above the average by 2.3 degrees only in the South-West, but below the normal elsewhere, by about one degree along the South Coast, by 1–2 degrees in the interior and South-East, and about 3 degrees in Kaffraria, the deficits ranging, however, from 0.0° at Cape Agulhas to 4.2° at Aliwal North. The mean monthly temperature was therefore above the average by 2–3 degrees in the West and South-West, and a few tenths above or below the average elsewhere except in Kaffraria and one or two stations in the South and East, where the deficiency again increased to 1–3 degrees. The mean warmest station was Mochudi, with a temperature of 75.6° , and the mean coolest, Disa Head (Table Mountain), with 57.1° , a difference of 18.5° . The highest mean maximum of 91.2° is found at Mochudi, Kimberley coming next with 91.1° , and the lowest mean minimum of 44.1° at Hanover. The highest temperatures of the month were registered on 14 days, chiefly during a warm spell from 21st to 27th, and mostly on 23rd, 24th, as also on 7th and 13th; the lowest readings were recorded on an equal number of days, principally during cool spells from 11th to 16th and 21st to 22nd, but mostly on 22nd, 19th, and 15th. The mean of the highest readings (94.1°) is 7.0° above the value for November, 1908, and 8.8° above that for October last, whilst the mean of the lowest readings (44.3°) is 1.7° and 4.4° , respectively, higher than the corresponding values for these same months. The mean monthly range of 49.8° is 5.3° more than in the previous November, and 4.4° more than during the immediately preceding month. Temperatures exceeding 100° were practically common to all the lower stations in the West and South-West on the 23rd, the highest for the month being 110° at Port Nolloth on 21st, and the lowest, 35.0° , at Evelyn Valley on the 19th. *Frosts* were light and limited to 5 days—at Sunnyside (Albany) on 2nd, Theefontein on 16th and 19th, and Kokstad on 21st and 23rd. At Retreat (Cape Peninsula) the grass minimum did not fall below freezing-point during the month, the readings ranging from 37.8° on 15th to 58.6° on 30th; while the mean (49.0°) was 5.9° lower than the minimum in shade.

The mean proportion of *Cloud* amounted to 47 per cent., being 4 per cent. more than the previous November, and 4 per cent. less than during October last. It was mostly between 45 and 50 per cent. in the West, South and East, but from 25 to 35 per cent. inland, varying between 66 per cent. at Port St. John's and 23 per cent. at Rietfontein (Aliwal North). *Fogs* and *Mists* were of more frequent occurrence than during October, but less numerous than during the corresponding month of the previous year; in all, 120 instances of this phenomenon were noted on every day except the 12th, being most frequently reported on 28th and 29th. The prevalent morning *Winds* were Southerly in West and South-West, Easterly at Danger Point and Cape Agulhas, Westerly (N.W. to S.W.) in the East, South-Easterly in the North-East of Colony and in Rhodesia; and Northerly at Kimberley. The mean *Force* was slightly less than usual, being 2.08 on the Beaufort Scale, equivalent to a velocity of 13.4 miles per hour. The winds were of moderate strength all over the country, attaining the greatest velocity in the South-West and South, decreasing in intensity Eastwards and Northwards, but increasing in force again in Bechuanaland and Rhodesia. The Royal Observatory records show an excess of winds from points between S. and S.E., but a marked decrease in all, having a Westerly component. The mean force there was 2.03 corresponding to an increased velocity over the normal of 1.45 miles per hour. *Gales* and *Strong Winds* were less frequent than in October, 35 instances of this intensity being noted on 17 days, particularly on the 17th. *Hot Winds* occurred at 10 stations on 7 days, chiefly the 7th and three (3) *Duststorms* on 2 days, 3rd and 26th.

The mean value of the barometric readings at the Royal Observatory was 30.04 ins., or 0.01 ins. higher than usual. It varied between 29.78 on the evening of the 25th and 30.24 on the morning of 15th.

STATIONS.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory	76.0	57.3	66.6	100.8	23	47.6	13
Cape Town (S.A.C.)	77.6	58.0	67.8	102.5	22	50.0	1, 12 & 16
Table Mountain (Disa Head)	64.0	50.2	57.1	88.0	23	42.5	14
Do. (Devil's Peak)	69.8	51.8	60.8	98.0	23	43.0	14
Wynberg	74.7	55.2	65.0	101.5	23	48.0	13
Groot Constantia	73.5	56.1	64.8	99.0	23	49.0	11
Retreat	74.0	54.9	64.4	101.1	23	45.8	13
Bishopscourt	72.3	50.3	61.3	98.0	23	42.0	14
Danger Point	66.6	56.7	61.6	74.0	23	50.0	27
Groot Drakenstein	80.8	55.5	68.2	103.1	23	43.3	13
Elsenberg (Agri. College)	75.1	51.7	63.4	100.6	23	43.0	2
Robertson Plantation	82.4	53.2	67.8	103.0	23	45.0	12
Malmesbury	82.4	55.3	68.8	102.4	23	45.0	13
Port Nolloth	71.4	49.5	60.4	110.0	21	43.5	13 & 4
Heidelberg	79.5	52.8	66.2	103.0	23	45.0	12 & 5
George (Plantation)	69.8	52.5	61.2	89.0	23	47.0	21 & 16
Cape Agulhas	68.7	57.6	63.2	74.0	13	51.0	1
Cape St. Francis	68.8	56.9	62.8	72.0	24 & 25	49.0	16
Port Elizabeth	69.6	57.1	63.4	76.0	26 & 27	51.0	19
Van Staadens	72.6	52.1	62.3	92.0	25	45.0	1
Amalienstein	82.8	53.3	68.0	99.0	23 & 24	45.0	2
Hanover	82.3	44.1	63.2	92.0	14	38.0	21
Kimberley	91.1	55.0	73.0	99.4	7	48.0	1
Sydney's Hope	73.8	51.8	62.8	95.0	24	45.0	19 & 21
Lovedale	80.6	52.8	66.7	99.0	24	41.0	19
Stutterheim	75.3	51.3	63.3	91.9	3	38.7	22
East London	71.6	58.5	65.0	77.0	13	48.0	19
Cathcart	75.0	46.1	60.6	90.6	7	35.1	19
Evelyn Valley	69.3	47.4	58.4	87.0	24 & 25	35.0	19
Chiselhurst	79.5	59.4	69.4	88.0	10	47.0	18
Queenstown	84.2	50.7	67.4	96.0	24	40.0	22
Aliwal North	84.1	48.0	66.0	93.5	7	39.0	22
Rietfontein (Aliwal N.)	79.3	48.3	63.8	90.1	7	37.2	21
Tabankulu	76.0	50.4	63.2	96.0	9	39.5	22
Port St. John's	72.9	58.2	65.5	81.0	7	51.0	22
Main	77.3	50.9	64.1	98.5	7	43.5	22
Mount Ayliff	78.6	52.7	65.6	98.5	13	41.0	22
Umtata	75.6	52.4	64.0	102.0	7 & 13	43.0	22
Kokstad	75.2	48.3	61.8	93.0	13	37.4	22
Mochudi	91.2	60.0	75.6	104.0	10	49.0	22
Hope Fountain	82.8	58.1	70.4	96.8	12	48.8	19
Means	76.3	53.2	64.7	94.1	...	44.3	...
Extremes	...	...	...	110.0	21	35.0	19

OBSERVERS' NOTES.

VRUCHTBAAR (Wellington).—The South-East storm on the 19th and 20th has done an enormous amount of harm to fruit trees and vines in this district. The fruit crop, which promised to be a good one, was in many cases totally destroyed. The vines also suffered badly.

- UITENHAGE PARK.**—A dry windy month. Rainfall far below average of last seven years; conditions very trying to vegetation.
- RYEDALE (Aberdeen).**—Drought as bad or worse than last year. Stock trekking in all directions.
- THEEFONTEIN (Hanover).**—Most unaccountable weather during first three weeks. Cold, high winds blowing frequently between N.W. and S.W., with intensely clear atmosphere and hot sun. Early mornings very keen and chilly; slight frost on 16th and 19th. Numerous swarms of voetganger locusts appeared, but were mostly destroyed by the use of the Government free poison, thus saving crops. Wheat and other cereals badly damaged by drought. Insects of all kinds very troublesome in vegetable gardens, necessitating frequent sowings. Drought unbroken.
- VARKENS KOP (Middelburg).**—Fitful South-Easters during the month, followed by Westerly winds.
- WAVERLEY (Queenstown).**—Hopping locusts on farm up to 16th. Terribly dry, dams all empty.
- SUNNYSIDE (Hay).**—Stock in good condition and free from disease. Veld very dry, so that rain will be welcome.
- ALEXANDRIA.**—Crops promising, some are being gathered in.
- EXWELL PARK (Cathcart).**—Drought broken, great relief.
- HUXLEY (Stutterheim).**—The rain on the 30th was just in time, as the springs were just about done, also the grass. We want a lot more very soon. Mealies will be late—if any. Cattle very thin, but sheep doing well. We are 2½ inches short of last year's rainfall for November.
- CLIFTON (Sterkstroom).**—Crops a failure. Veld fairly good. No locusts. Fountains slightly weaker.
- THIBET PARK (Queenstown).**—Fearfully dry.
- KOKSTAD.**—Weather very variable during month, with hot westerly winds to very cold mornings and evenings with frost.
- ARMADILLO'S CREEK (Vryburg).**—The usual N.W. wind of last season has been absent; fitful breezes from East and South being substituted, and in spite of the favourable position of the moon and a wet season, as forecasted by the Natal Meteorologist, the country is in a parched condition, and not a mealie pip planted. Highest shade reading 98°. Stock doing well.
- NOTTINGHAME (Mafeking).**—Owing to the tremendous rainfall during the first three months of year, the veld is still green, but rain is wanted badly to facilitate ploughing operations, which are at a standstill.
- STUTTERHEIM (Bousfield).**—Very few mealies planted. Most that were planted September and October, destroyed by worms. Prevalent disease—Small-pox in district, neighbourhood of Kei River. Stock low in condition.
- SUNNYMEADE (Albert).**—Very dry month. No sign of moisture from the S.E. Stock doing well. Crops in these parts have been reaped; not very good owing to frosts last month.
- CARNARVON FARM.**—This month, *ride* annexed table, has just about held its wind, frost and no cloud averages of the last 10 years. Rainfall, however, is just above half the average, and, coming at long intervals, has done but little good to veld or crops. Stock of all kinds are in good condition; have never been poor during the whole year. No cattle lost through poverty anywhere that I have heard. Water is scarce, being the only drawback. Crops generally very far below the average. Mealies a failure; now too late to sow in this district. The Heilbron Conference of two months ago estimated the O.R.C. yield for 1910 at 5,000,000 bags mealies. How impossible to count chickens in this country before they are hatched.

Year.	Rain.	Wind.	Frost.	No Clouds.
1901	0.52	6	3	1
1902	0.85	11	6	6
1903	2.35	13	2	1
1904	0.12	17	1	0
1905	1.25	6	5	1
1906	3.18	6	2	0
1907	1.92	17	4	0
1908	0.62	18	4	0
1909	0.69	13	4	1
Means	1.28	12	31	1

RAINFALL, NOVEMBER, 1909.

I. CAPE PENINSULA :

	INS.
Royal Observatory (a) 12in. gauge	0.50
Cape Town, Fire Station...	0.54
Do. Molteno Reservoir ...	0.75
Do. Platteklip ...	1.15
Do. Signal Hill ...	0.41
Sea Point, The Hall ...	0.40
Camp's Bay ...	0.50
Table Mountain, Disa Head ...	0.87
Do. Kasteel Poort...	1.52
Do. Waai Kopje ...	1.02
Do. St. Michael's ...	1.33
Devil's Peak, Blockhouse ...	1.28
Do. Nursery ...	1.16
Woodstock (The Hall)...	0.51
Do. (Municipal Quarry) ...	1.07
Do. (Do. Nipher's Shield) ...	1.06
Newlands, Montebello ...	0.46
Bishops court ...	0.20
Kenilworth ...	0.13
Wynberg, St. Mary's ...	0.58
Groot Constantia ...	0.66
Tokai Plantation ...	0.50
Plumstead, Culmwood ...	0.21
Cape Point... ..	0.35
Robben Island ...	0.47
Maitland Cemetery ...	0.23
Tamboers Kloof ...	0.68
Woodhead Tunnel...	1.69
Lower Reservoir ...	0.75
Maclears Beacon ...	1.02
Waai Vlei ...	1.60
Woodhead Dam ...	1.46

II. SOUTH-WEST :

Eerste River ...	0.23
Klapmuts ...	0.50
Stellenbosch, Gaol ...	0.49
Somerset West ...	1.25
Paarl ...	0.31
Wellington, Gaol ...	0.15
Groot Drakenstein, Weltevreden	0.44
Porterville Road ...	0.33
Tulbagh ...	0.26
Kluitjes Kraal ...	0.32
Ceres ...	0.40
The Oaks ...	0.50
Rawsonville ...	0.50
Caledon ...	0.29
Worcester, Gaol ...	1.25
Hex River ...	0.64
Karmelks River ...	0.62
Lady Grey, Div. Robertson	1.07
Robertson, Gaol ...	1.21
Do. Govt. Plantation ...	1.14
De Hoop ...	0.50
Montagu ...	0.00
Danger Point ...	0.92
Elgin Plantation ...	0.29
Elsenberg Agricultural College...	0.48
Roskeen ...	0.44
Vruchtbaar ...	0.49

III. WEST COAST :

Port Nolloth (Lient. Barber) ...	0.02
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III. WEST-COAST (continued) :

	INS.
Anenous ...	0.17
Klipfontein ...	0.25
Kraaifontein ...	0.00
Springbokfontein ...	0.00
Garies ...	1.04
Lilyfontein ...	0.39
Van Rhyn's Dorp ...	0.27
Clanwilliam, Gaol ...	0.11
Dassen Island ...	0.15
The Towers ...	0.04
Malmesbury ...	0.29
Piquetberg ...	1.55
Welbedacht ...	0.12
Hopefield (Gaol) ...	0.00
Algeria (Clanwilliam) ...	0.27
Cedarberg (do.) ...	0.27

IV. SOUTH COAST :

Cape Agulhas ...	0.70
Swellendam ...	0.75
Grootvaders Bosch ...	1.00
Heidelberg ...	0.50
Riversdale ...	0.15
Mossel Bay ...	0.50
Great Brak River...	1.18
George ...	2.02
Do. (Plantation)	2.05
Woodfield (George) ...	1.60
Millwood ...	1.85
Sour Flats ...	1.56
Knysna ...	0.74
Buffel's Nek ...	3.50
Plettenberg Bay ...	0.82
Harkerville ...	2.47
Blaauwkrantz ...	1.83
Humansdorp ...	1.11
Cape St. Francis ...	0.87
Witteklip (Sunnyside) ...	1.46
Van Staden's (Intake) ...	1.63
Do. On Hill ...	2.30
Kruis River ...	0.83
Uitenhage (Gaol)...	0.78
Do. (Park) ...	0.69
Armadales (Blue Cliff) ...	0.00
Dunbrody ...	0.43
Port Elizabeth (Harbour)	1.70
Do. (Walmr Heights)	1.77
Shark's River (Nursery)...	1.89
Centlivres ...	0.51
Potteberg ...	0.47
Edinburgh (Knysna) ...	1.59
The Slip, Port Elizabeth...	1.29

V. SOUTHERN KAROO :

Ladismith ...	0.21
Amalienstein ...	0.27
Calitzdorp ...	0.30
Oudtshoorn ...	0.00
Vlaakte Plaats ...	0.55
Uniondale ...	0.35

VI. WEST-CENTRAL KAROO :

Fraserburg Road ...	0.38
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VI. WEST-CENTRAL KAROO : *contd.* INS

Prince Albert	1.09
Zwartberg Pass	2.00
Dunedin	0.34
Nel's Poort	0.11
Camfers Kraal	0.35
Krom River	0.00
Roos Plaats	0.00
Lemoenfontein	0.00
Paarde Kraal	0.00
Baaken's Rug	0.17
Willowmore	0.31
Rietfontein	0.00
Steytlerville	0.82

VII. EAST-CENTRAL KAROO.

Aberdeen Road	0.12
Klipplaat	0.25
Kendrew, Holmes	0.00
Graaff-Reinet, Gaol	0.37
Do. (Eng. Yard)	0.24
New Bethesda	0.08
Roodebloem	0.41
Glen Harry	1.30
Wellwood	0.21
Bloemhof	0.60
Jansenville	0.05
Roode Hoogte	0.16
Toegedacht	0.00
Klipfontein	0.16
Pearston	0.34
Middlewater	0.18
Somerset East, Gaol	1.33
Cookhouse	0.30
Spitzkop (Graaff-Reinet)	0.34
Middleten	0.64
Grobelaar's Kraal	0.05
Gordonville (Graaff-Reinet)	0.05
Muchputfontein	0.00
Zeekoe River (Aberdeen)	0.72

VIII. NORTHERN KAROO :

Calvinia	0.37
Middlepost	0.40
Sutherland	0.51
Fraserburg	0.19
Carnarvon	0.11
Brakfontein	0.03
Victoria West	0.00
Britstown	0.21
Wildebeestkooij	0.00
De Kruis (Murray'sburg)	0.23
Richmond	0.09
Hanover	0.05
Philipstown	0.49
Petrusville	0.35
The Willows (Middelburg)	0.34
Colesberg	0.00
Fish River	0.28
Varkens Kop	0.60
Droogfontein	0.38
Craddock (Gaol)	0.00
Witmoos	0.53
Marnsburg	0.45
Steynsburg (Gaol)	0.48
Hillmoor	0.37
Tarkastad	0.60
Drummond Park	0.00
Waverley	0.59
Schuihoek	0.07

VIII. NORTHERN KAROO (*con.*) : INS.

Vosburg	0.09
Zwavelfontein	0.11
Bultfontein (Colesberg)	0.25
Elandsvlei (Calvinia)	0.00
Rietfontein (Div. Hanover)	0.17
Hartebeestfontein (Steynsburg)	0.41
Willow Walk (Tarkastad)	1.16
Hotweg Kloof (Craddock)	1.14
Thebus Waters	0.27

IX. NORTHERN BORDER :

Kenhardt	0.34
Trooiapspan	0.44
New Year's Kraal	0.24
Dunmurry	0.11
Karree Kloof	0.40
Griquatown	0.86
Douglas	0.78
Hope Town	0.35
Newlands, Barkly West	0.14
Barkly West	0.26
Kimberley (Gaol)	0.33
Strydenburg	0.64
Rietfontein (Gordonia)	0.00
Douglas (Vos)	0.06
Rocklands (Barkly West)	0.27

X. SOUTH EAST :

Melrose (Div. Bedford)	0.69
Dagga Boer	0.46
Fairholt	0.71
Lynedoch	0.58
Alicedale	0.57
Cheviot Fells	0.69
Bedford (Gaol)	1.11
Sydney's Hope	0.90
Cullendale	1.04
Adelaide	0.63
Atherstone	1.32
Alexandria	1.07
Fort Fordyce	0.91
Graham's Town (Gaol)	1.71
Heatherton Towers	0.58
Sunnyside	0.76
Fort Beaufort	1.08
Katberg	2.70
Scymour	1.38
Glencairn	1.84
Lovedale	1.12
Port Alfred	0.77
Hogsback	4.57
Peddie	1.24
Exwell Park	0.90
Keiskamma Hoek	1.91
Cathcart (Gaol)	1.59
Cathcart (Forman)	0.52
Cathcart	1.64
Thaba N'doda	1.79
Evelyn Valley	6.16
Crawley	1.07
Thomas River	1.53
Perie Forest	2.55
Isidenge	2.61
Kologha	2.40
King William's Town (Gaol)	0.82
Sutterheim (Bouafield)	2.10
Fort Cunyngame	1.81
Dohne	2.04
Kubusie	0.70
Quacu	2.47

X. SOUTH EAST (continued) : INS.

Bolo	2·17
Fort Jackson	0·40
Komgha (Gaul)	2·11
Chiselhurst... ..	2·30
East London West	0·32
Cata	2·44
Wolf Ridge	2·82
Dontsah	2·11
Mount Coke	0·56
Blackwoods	1·60
Albert Vale (near Bedford)	0·69
Huxley Farm, Stutterheim	2·05
Izileni (King Wms. Town)	2·60

XI. NORTH-EAST :

Venterstad	0·37
Mooifontein	0·90
Burghersdorp (Gaul)	1·56
Ellesmere	1·36
Broughton (Molteno)	0·24
Thibet Park	0·37
Sterkstroom (Station)	0·85
Rocklands	0·50
Aliwal North (Gaul)	0·77
Buffelsfontein	0·57
Carnarvon Farm	0·69
Jamestown	1·00
Whittlesea	1·62
Queenstown (Gaul)	0·94
Do. (Beswick)	1·23
Rietfontein (Aliwal North)	1·34
Dordrecht	0·16
Herschel	1·06
Lady Grey	1·18
Lady Frere... ..	1·12
Contest (Near Bolotwa)	1·50
Keillands	1·16
Barkly East	1·66
Blikana	2·59
Cliftonvale... ..	1·40
Hughenden	1·07
Glenwallace	0·56
Lady Grey, Station	1·30
Indwe (Collieries)... ..	1·52
Hopewell (Imvani)	0·73
Sunnymede (Div. Albert)	0·00
Clifton (Sterkstroom)	0·68
Edendale (Queenstown)	1·70

XII. KAFFRARIA.

Ida (Xalanga)	1·53
Skate (Xalanga)	1·04

XII. KAFFRARIA (contd.)

INS.

Cofimvaba	0·29
Tsomo	0·88
N'qamakwe	1·67
Main	0·66
Engcobo	1·84
Butterworth	1·39
Woodcliff	3·12
Kentani	2·68
Maclear	3·17
Idutywa	0·37
Bazeya	5·13
Willowvale	3·16
Mount Fletcher	3·00
Somerville (Tsolo)	2·14
Elliotsdale	2·00
Umtata	2·80
Cwebe	4·14
Tabankulu	1·74
Mount Ayliff	2·78
Kokstad	2·73
Do., The Willows	2·83
Seteba	3·80
Flagstaff	4·75
Insikeni	4·76
Port St. John's	7·86
Umzimkulu	3·56
Maclear (Station)... ..	3·46
Tabankulu (Atkins)	2·67
Umzimkulu (Strachan)	4·46
Lusikisiki	4·46
Elliot	2·52
Tent Kop (Elands Height)	2·36
Elton Grange (Mount Currie)	2·81

XIII. BASUTOLAND :

Mafeteng	2·17
Mohalies Hoek	1·84
Maseru	1·88
Qucha's Nek	5·48

XV. BECHUANALAND :

Taungs	0·72
Vryburg	0·39
Setlagoli	0·88
Nottingham (Mafeking)	1·28
Masilibitsani	0·40
Armادillo Creek	0·33
Mochudi	2·07

XVI. RHODESIA :

Hopefontain	1·26
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Cure and Preventative
FOR
WIRE WORM
 In SHEEP and GOATS
AND
PREVENTATIVE FOR TAPEWORM IN LAMBS.



Bert Bowkers Cure.

TRADE MARK.

THIS IS THE TRADE
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IMITATIONS.

EVERY CARTON OF BERT
 BOWKERS CURE bears this
 Trade Mark (a Merino Ram,) and full directions for use on Label.

BERT BOWKERS CURE for Wire Worm in Sheep and Goats is the only long established preparation in the market. It has been proved to be an absolutely sure and safe cure, if used according to directions, by many hundreds of Sheep Farmers from Cape Town to British East Africa.

It has become an established fact that it is a Cure. It is a sure preventative for "Geil Ziekte," and Safe Cure for Worms in Horses and Cattle.

The Price is 2/- per lb. Cash, from all Agents.

Agencies have now been established throughout the Cape Colony, O.R.C. and Transvaal.

Ask your storekeeper for it; if he cannot supply, please write to the undersigned. All inquiries promptly answered.

M. W. GRADWELL,
Proprietor and Manufacturer

WOODLANDS,
 P.O. CARLISLE BRIDGE,
 CAPE COLONY.

CURRENT MARKET RATES (WHOLESALE) OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Friday, the 24th December, 1909, ruling at the several centres named, is published for general information.

CENTRE	A.	B.	C.	D.	E.	F.	G.	H.	J.	K.	L.	M.	N.	O.	P.	Q.	R.
	Wheat per 100 lbs.	Wheat Flour per 100 lbs.	Boer Meal per 100 lbs.	Mealies per 100 lbs.	Mealie Meal per 100 lbs.	Barley per 100 lbs.	Oats per 100 lbs.	Oat-hay per 100 lbs.	Lucerne Hay. per 100 lbs.	Potatoes per 100 lbs.	Tobacco (Boer Roll) per lb.	Beef per lb.	Mutton per lb.	Fresh Butter per lb.	Eggs per doz.	Cattle (Slaughter) £10 £9 £12	Sheep (Slaughter)
Albany North..	£ s. d. 0 12 6	£ s. d. 1 1 6	£ s. d. 0 13 9	£ s. d. 0 5 9	£ s. d. 0 7 6	£ s. d. 0 8 0	£ s. d. 0 10 0	£ s. d. 0 5 0	£ s. d. 0 3 9	£ s. d. 0 12 6	£ s. d. 0 1 0	£ s. d. 0 0 4	£ s. d. 0 0 2	£ s. d. 0 0 3	£ s. d. 0 1 6	£ s. d. 0 1 6	£10
Beaufort West	0 10 0	0 18 0	0 14 0	0 6 3	0 8 0	0 9 6	0 6 4	0 5 0	0 5 0	0 8 0	0 0 8	0 0 2	0 0 3	0 0 3	0 1 6	0 1 6	£9
Burgersdorp	0 10 6	0 18 6	0 15 9	0 6 6	0 8 0	0 8 5	0 10 0	0 4 6	0 4 6	0 8 0	..	0 0 8	0 0 4	0 0 4	0 1 0	0 1 0	£12
Cape Town ..	..	..	..	..	..	0 6 6	0 5 3	0 4 0	0 5 9	0 7 0	..	..	..	0 1 3	0 1 3	..	..
Olauwiliam ..	0 11 0	..	0 12 3	0 6 0	..	..	0 5 6	..	0 3 9	0 7 0	0 0 9	0 0 5	3d. to 5d.	0 1 3	0 1 3	..	..
Colonsberg ..	1 2 6	..	..	0 6 0	..	..	..	..	0 3 9	..	..	..	0 0 3	0 1 3	0 1 0	..	..
Craddock ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dordrecht ..	0 11 6	1 0 0	0 16 0	0 6 6	0 8 6	0 10 0	0 8 0	0 6 0	0 6 0	0 10 0	0 1 0	0 0 3	0 0 3	0 1 5	0 1 0	£9	13/6
East London ..	0 8 0	0 18 0	0 15 0	0 5 0	0 13 0	0 5 6	0 3 0	0 4 0	0 5 6	0 11 0	0 1 0	0 0 3	0 0 4	0 1 6	0 1 0	£10	20/-
Grat-Belnet ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grassmstown ..	0 10 8	0 16 3	0 14 9	0 6 9	..	0 5 9	0 6 9	0 4 1	..	0 6 3	0 0 5	0 0 5	0 0 5	0 2 5	0 1 5	..	..
Kimberley ..	0 12 3	0 16 3	0 14 9	0 6 9	0 5 9	0 6 3	0 7 0	0 5 3	0 4 9	0 12 0	0 0 5	0 0 8	0 0 5	0 1 5	0 1 0	£7 15s.	11/3
King William's ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Town ..	0 10 0	0 18 0	0 15 0	0 6 0	0 7 6	0 7 0	0 8 0	0 4 0	0 4 0	0 6 6	0 0 4	0 0 4	0 0 4	0 1 0	0 1 1	£15	17/6
Melbourn ..	0 10 0	0 15 0	0 12 6	0 6 3	..	0 8 3	0 4 6	0 2 6	..	0 5 6	0 0 4	0 0 6	0 0 5	0 1 3	0 1 0	£12	14/-
Moss Bay ..	0 12 0	0 18 6	0 14 0	0 6 3	..	0 8 3	0 4 6	0 2 6	..	0 5 6	0 0 4	0 0 6	0 0 5	0 1 3	0 1 0	£15	15/-
Port Alfred ..	0 13 0	0 19 6	0 16 0	0 6 3	0 10 0	0 8 0	0 8 0	0 3 6	..	0 9 0	0 0 6	0 0 6	0 0 5	0 2 3	0 1 0	..	..
Port Elizabeth ..	0 11 0	..	..	0 6 3	0 10 0	0 8 0	0 8 0	0 3 6	..	0 9 0	0 0 6	0 0 6	0 0 5	0 2 3	0 1 0	..	..
Queenstown ..	0 17 0	..	..	0 6 3	0 8 0	0 9 0	0 8 0	0 4 0	0 7 0	0 6 6	0 0 4	0 0 5	0 0 5	0 1 3	0 1 0	..	..
Thurston ..	0 12 0	1 2 0	0 13 6	0 6 0	0 13 0	0 7 0	0 4 8	0 4 6	0 4 0	0 12 6	0 1 0	0 0 4	0 0 4	0 1 3	0 1 0	£7	15/-
Vryburg ..	0 15 0	1 0 0	0 12 6	0 4 0	0 6 6	0 9 0	0 10 0	0 7 0	0 5 6	0 8 0	0 0 4	0 0 8	5d. to 7d.	0 1 6	0 1 0	£8 to £10	9/- to 12/-
Worcester ..	0 10 6	0 15 6	0 12 6	0 7 6	0 8 6	0 7 6	0 5 6	0 2 9	0 4 6	0 5 0	0 0 5	3d. to 6d.	0 0 3	0 1 6	0 1 3	£8 10s. to £9	12/6 to 14/-

NOTE.—A blank space denotes "no transactions."

FREE GIFTS! HANDSOME PRESENTS!

Write TO-DAY for Mendelsohn's Handsome ILLUSTRATED CATALOGUE (B 22) containing full particulars of their Great Free Bonus Scheme, by which everyone who sends "Cash with Order" receives a

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18-ct. Gold, set 5 Diamonds,
£7 10s., other prices,
£5. £10. £15. £20.



18-ct. Gold, set 5 Fine
Diamonds, £11 10s.



18-ct. Gold, set Beautiful
Diamond, £15, £20,
£30, £40.



9-ct. Gold Brooch. 9/6

MENDELSON'S

Help You to **SAVE MONEY** by
supplying you with **SINGLE**
ARTICLES AT WHOLESALE
PRICES.



18-ct. Gold, set Diamond
and Gem. £3 10s.,
2 Diamonds, £5 5s.



18-ct. Gold, set 2 Diamonds
and 1 Gem. 50/-
Various others, 25/- 30/-
40/-



18-ct. Gold, set 1 Fine
Diamond, 37/6

*A Name that stands for Quality in Watches.
See that it shows on your dial!*



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MENDELSON'S

25 YEARS WRITTEN GUARANTEE

FAMOUS LEVER

SENT ON 30 DAYS FREE TRIAL

ILLUSTRATED CATALOGUE SENT POST FREE

I. MENDELSON & CO Manufacturers,
73, Burg Street, CAPE TOWN. TWO DOORS FROM CENTRAL FIRE STATION

SILVERORE

176

SCREW CASES

STERLING SILVER

42

DUST & DAMP PROOF.

PRODUCE MARKETS.

CAPE TOWN.

R. Müller (Produce Department), Cape Town, reports for the month ending December 31 :—

Ostrich Feathers.—The turnover has been comparatively small. Prices have receded about 5 per cent.. However, all good classes of Feathers remain in good demand, and are sold at satisfactory prices. All superior Feathers find a ready market for the local trade.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes ...	19	0	0	32	0	0	Floss ...	0	7	6	1	10	0
First, ordinary to							Long Drabs ...	2	5	0	4	0	0
Seconds ...	11	5	0	17	10	0	Medium Drabs ...	0	15	0	1	10	0
Seconds ...	7	10	0	9	10	0	Short to Medium ...	0	5	0	0	15	0
Thirds ...	3	0	0	5	10	0	Floss ...	0	5	0	1	10	0
Femina Super ...	9	10	0	16	0	0	White Tails ...	1	2	6	2	0	0
Do., Seconds to							Coloured Tails ...	0	12	6	1	5	0
Firsts ...	4	10	0	11	0	0	Chicks ...	0	1	0	0	2	6
Byocks (Fancy) ...	4	5	0	9	10	0	Spadonas ...	0	10	0	1	15	0
Long Blacks ...	2	15	0	6	10	0	Inferior Black and						
Medium Blacks ...	1	10	0	3	10	0	Drabs, short to						
Short to Medium ...	0	10	0	1	5	0	long ...	0	0	6	1	10	0

Wool.—The Market remains firm and competition has been very fair. Prices realised must be considered quite satisfactory. The following are some of the prices recently realised, viz. :—Calvinias, 9½d.; Bredasdorp, 7½d.; Caledons, 9½d.; Roggeveld, 8½d.; Karoo, 7d.; Super Snow White, 20½d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld ...	0	6	0	9½	Wool for Washing ...	0	4½	0	7
Do. Karoo ...	0	6	0	7½	Snow-white Super to Extra	1	4	1	8½
Medium ...	0	5	0	6½	Do. Ordinary ...	1	2	1	5
Short and inferior ...	0	3	0	4½	Fleece Washed ...	0	0	0	10

Mohair.—In this article very little is doing. Inferior qualities are being neglected, whilst there is a fair demand for Superior Hair.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer ...	0	7	1	1	Winter ...	0	7	0	9½
Kids ...	1	3	1	9	Do. Kids ...	0	11	1	2½
Seconds ...	0	5	0	9					

Hides and Skins.—No material change has taken place since my last report. The demand remains very good, and fair supplies are constantly arriving from the country. Qualities all round show an improvement on the past.

	s.	d.	s.	d.		s.	d.	s.	d.
Long woolled Skins ...	0	5½	0	6½	Goat, heavy to light ...	0	10½	1	2½
Short ...	0	4	0	4½	Sundried ...	0	0	0	6
Shorn ...	0	0	0	3	Angoras ...	0	4	0	6
Bastards ...	0	8½	0	4	Sundried Hides ...	0	6½	0	7½
Cape Skins, each ...	2	3	2	8	Salted ...	0	5½	0	7
Do., cut, each ...	0	0	1	1	Wet ...	0	8½	0	4½

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Established 50 years.

THE CORRECT PLACE FOR
Genuine Value, Style, Fit
AND LARGE SELECTION IN
OUTFITTING.

Gentlemen's, Boys' and Youths' Suits, Hats, Hosiery, Ties,
Braces, Shirts, Waterproofs, Rugs, Bags. All sizes and prices.

We keep the Right Class of goods for country wear in High Class quality.

T. BIRCH & CO., Ltd., Port Elizabeth.

Branches in LONDON and throughout SOUTH AFRICA.

ARSENATE OF LEAD

For Codling Moth in Fruit Trees, Kolander and all
Leaf Eating Insects. Jars 1 lb., 2 lbs., 10 lbs.

LYE

For Raisin and Prune making. In 1 lb. & 10 lb. tins.

FLOWERS OF SULPHUR.

Sulphurators Machines for Sulphuring Vines,
Knapsack Sprayers.

BEE HIVES

And all Bee Requisites. Tamlin's Incubators. Seeds.
Lucerne. Rape. Paspalum, etc.

WRITE FOR PARTICULARS.

WOODHEAD, PLANT & CO., CAPE TOWN.

PORT ELIZABETH.

Messrs. J. Daverin & Co. report under date December 24 :—

Ostrich Feathers.—Owing to the approaching holidays, only two days' market was held this week, when the usual average assortment was offered. Competition was general and active, and prices all round ruled firm. The total quantity sold (including the extra day's sale held last week) weighed 4,550 lbs. 14½ ozs., which realised £12,503 9s. 8d. Stocks have been greatly reduced, and at present are smaller than they have been at any time during the past year.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.				
Primes: Extra Super				Special Prices.			Blacks: Long	...	2	0	0	to	7	0	0		
Good to Super	...	20	0	0	to	35	0	0									
Whites: Firsts	...	12	0	0	„	18	0	0	Medium	...	1	0	0	„	3	0	0
Seconds	...	4	0	0	„	11	0	0	Short	...	0	4	0	„	1	0	0
Thirds	...	1	0	0	„	4	10	0	Wirey	...	0	0	3	„	0	0	6
Feminas: Super	...	10	0	0	„	20	0	0	Floss	...	0	4	0	„	1	0	0
Firsts	...	6	10	0	„	10	10	0	Drabs: Long...	...	0	15	0	„	4	0	0
Seconds	...	2	10	0	„	7	10	0	Medium	...	0	10	0	„	1	10	0
Thirds	...	0	10	0	„	2	10	0	Short...	...	0	1	6	„	0	7	6
Greys	...	1	10	0	„	7	0	0	Wirey	...	0	0	3	„	0	0	6
Fancy ...	...	2	10	0	„	8	0	0	Floss...	...	0	4	0	„	1	2	6
Tails: White ...	...	0	10	0	„	2	10	0	Spadonas: Light	...	0	5	0	„	4	10	0
Light ...	...	0	10	0	„	2	0	0	Dark	...	0	2	6	„	1	15	0
Coloured & Dark	0	0	6	„	0	15	0		Chicks...	...	0	0	6	„	0	12	6

Wool.—This market continues firm, and a fair amount of business has again been done in the open market at full current prices. Stocks held here now will not exceed 4,500 bales, which is a very small quantity for this time of the year. At the Catalogue Sales on Wednesday, 1,250 bales were offered, of which only a small proportion was sold. All light, well-conditioned parcels were in active demand at full prices, but heavy and faulty lots were neglected.

Snowwhite, Extra Superior	...20d to 20½d	Grease, Coarse and Coloured	... 1½d to 4d
Do. Superior	... 17½d „ 19d	Scoured do. do.	... 1½d „ 8½d
Do. Good to Superior	... 16½d „ 17d	Basuto Grease, short	... 6½d „ 6½d
Do. Inferior Faulty	... 13½d „ 14½d	O.R.C. Grassveld Grease, long	
Grease, Super Long, well-conditioned, Grassveld		& well-conditioned	
grown (special clips)	... 8½d „ 10d	(special clips)	7½d „ 8d
Do. do. do.	... 7½d „ 8½d	Do. do. do.	6½d „ 7d
Do. do. Karoo grown		Do. do. medium grown,	
(special clips)	7½d „ 8½d	light, with little	
Do. do. do.	... 6½d „ 7½d	fault ...	... 6d „ 6½d
Do. do. Mixed Veldt...	7d „ 7½d	Do. do. short, faulty & wasty	4½d „ 5½d
Do. Light, faultless, medium		Do. do. Karoo grown, long &	
Grassveldt grown	... 6½d „ 7½d	well-conditioned	... 6½d „ 7½d
Do. do. Karoo grown	6½d „ 7½d	Do. do. medium grown, light	
Do. do. short. do.	6d „ 6½d	with little fault	... 6d „ 6½d
		Do. do. short, faulty and	
		wasty...	... 4½d „ 5½d

Mohair.—This market remains in a quiet state, but the undertone is distinctly good, and we are confident that a general move is not far off.

Super Kids		None offering	Mixed O.R.C. Hair (average)	8½d	to	10½d
Ordinary Kids and Stained		do.	Do. very mixed	7d	„	8d
Superior Firsts, special clips		12½d	Seconds and Grey	5d	„	7½d
Ordinary Firsts		11½d „ 12d	Thirds	4½d	„	4½d
Short Firsts and Stained		10d „ 10½d	Winter Kids, special clips	15d	„	15d
Superfine Long Blue O.R.C.			Do. good ordinary	13d	„	14d
Hair		10½d „ 13d	Winter Hair	9½d	„	9½d
			Basuto Hair	8½d	„	10d

Skins.—Sheepskins sold this week in bundles at 5½d., and Pelts at 4d. per lb.; Capes, 24d.; damaged, 6d. each; Goatskins, 13½d.; damaged, 7d. per lb.; and Heavy Goatskins, 8½d.; Angoras, 7½d.; Shorn, 5½d.; damaged, 3½d. per lb.; Johannesburg Sheep, 5½d.; Gout, 9d.; Angoras, 6½d.; Springbok, 8½d. each.

Hides.—Sundried, 9½d.; damaged, 8½d.; Salted, 8½d.; damaged, 7½d.; Thirds, 3d.

Horns.—3½d. each all round.

EAST LONDON.

Messrs. Malcomess & Co. report for the month ending December 31, 1909 :—

The chief feature of the current month has been the London Wool Sales, which opened on 27th ulto., and closed on the 5th inst. Contrary to expectations, the market opened, compared to the previous Wool Sales, unchanged for Superior Long Combing Grease, par to 5 per cent. lower for average ditto, and 5 per cent. lower for Short Grease. The steadiness is no doubt due to the strike that took place in Australia, and which is now ended. From the European side, latest cable advices report the market is unchanged, but little is doing as it is the end of the year.

The first of a series of Wool Fairs commenced here on the 11th for First Class Kaffrarian Farmers' Klips when about 600 bales were judged. The first prize was awarded to Mr. A. Shanks, who obtained 92½ points out of a possible 100, and realised 11½d. for Hoggetts; 11d. for 58 bales Ewes and Hamels; 10½d. for Second Ewes, averaging all round 10½d. The second prize went to Mr. W. R. Warren with 89½ points, who secured 11½d. for Hamels; 11d. for Wethers; 11½d. for Ewes; 7½d. for Bellies, and 6½d. for Locks and Pieces, averaging 10½d. per pound; whilst Mr. J. L. McLachlan secured the third prize with 82½ points, realising 11½d. for Long Skirted, 9½d. for 10 months, and 6½d. for skirts.

The Local Sales this month have resulted in rather heavy clearances. The first saw 2,300 bales, out of 3,500 offered, sold; second, 3,100 bales out of 4,400 sold; third, 2,300 bales, out of 3,500 sold; and the last sale, 2,100 bales, out of 3,700 were sold. In addition to this a good many private transactions have taken place, and in all about 13,000 bales have changed hands. Transkeis realised from 7d. to 7½d., and Basutos, 6½d. to 6¾d.

Super Long Light Kaff. Farmers and similar well-conditioned Wools, 9d. to 10d.; short, ditto, 7½d. to 8½d.; Long, well-skirted farmers, 7d. to 9½d.; Super Short, ditto, 6½d. to 7½d.; Good Long well-conditioned Grassveld, 6d. to 7½d.; Short, ditto, 5d. to 5½d.; Short, faulty and wasty Grease, 5d. to 5½d., and coarse and coloured grease, 3d. to 5d.

The stock of Wool is rather light, totalling about 4,000 bales unsold, which is very small for this time of the year. However, large quantities are soon expected.

Mohair.—We have no change to report, and the market remains quiet with little doing. Superior Long Blues have sold at 13d.; 10½d. to 11d. for average Long, little kempy; 10d. to 10½d. for Superior Basuto Hair; 5d. to 6½d. for Seconds; 3½d. to 5d. for Dockings and Grey; 9½d. to 9¾d. for good average Winter Hair; and 13d. to 14½d. for genuine White Kids.

Sundry Produce.—Hides are quoted at 9½d. and 8½d. for Sundried and Dry-salted, respectively; Goatskins, 12½d.; Angoraskins, 8½d.; Damaged, 7d. each; Sheepskins, 5½d.; Pelts and Coarse, 4d. to 4½d.; Transkeian and King William's Town lots, 4½d.; and Horns, 2d. to 4d. each, according to size and quality.

BREEDERS' DIRECTORY & FARMING NOTICES.

Advertisements under this heading are inserted at the rate of 30 words for 2s. 6d., (minimum charge) per insertion, and 6d. per line of approximately six words above that number. Payment must accompany Order. Cheques and P.O.O. to be made payable to the CENTRAL NEWS AGENCY 125-127, Long Street, Cape Town, to whom all communications should be addressed.

OSTRICHES.

SPECIALS ONLY.—Choice pairs, £50 to £100 per pair.—F. W. BAKER, Laughing Waters, Willowmore.

OSTRICHES.—Young and old.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co., Ltd., Porterville Road.

PIGS.

BERKSHIRE BOARS.—Pure bred. Ages two to fifteen months. Bred by Charles Leonard, Esq. on his well known "Gloria" Estate.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co., Ltd., Porterville Road.

PURE BRED BERKSHIRE PIGS.—Prize Winning Stock. Boars and Sows, £3 each. Also Buff Orpington and White Leghorn Poultry.—Apply MANAGER, Maitland River Farm, Green Bushes Hotel, Port Elizabeth.

CATTLE.

FRIESLAND BULLS. bred from the best IMPORTED stock, from a few weeks to fifteen months old.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co., Ltd., Porterville Road.

ENGLISH BREEDERS.—WILLIAM COOPER AND NEPHEWS, "Cooper Dip" Works, Berkhamsted, England. Shorthorn, Hereford and Polled Cattle; Shropshire Sheep; Berkshire and Large Black Pigs. 54 First Prizes at British Shows last year. Every facility given to Colonial Buyers. Send to W. C. & N., P.O. Box 305, East London, Cape Colony, for "Pedigree Stock and its Export," gratis and post free.

GENERAL.

PASPALUM GRASS PLANTS.—Strong roots per Ball or smaller plants per Post to any address. See larger advertisement, page ix, this Journal.—A. C. BULLER, Dwarsriviers Hoek, Stellenbosch.

PHALARIS COMMUTATA. This splendid new perennial pasture and fodder grass growing over six feet high giving grand feed when lucerne is dormant. Seed, 2/- per oz. 20/- per lb. Plants, 3/- per 100. 20/- per 1,000 in lots of 20,000 for £12.—From F. W. STRANGMAN, Erin Vale, Somerset West.

THE POULTRY YARD.

BUFF ORPINGTONS, SILVER WYANDOTTES, BLACK MINORCAS. Winners of over 90 prizes. Bred for Utility and Show points. PULLETS from 10/-, also COCKERELS from 7/6. Will improve the table and laying qualities of common fowls. Mrs. R. F. DOTT, Kenilworth, Kimberley.

R. W. HAZELL, Tregenna, Park Road, Rondebosch, Breeder of High Class Exhibition and Utility White Wyandottes, Black Orpingtons and Houdans. Wyandottes a speciality. Eggs and Stock for Sale. Inspection and correspondence invited. Many testimonials from pleased customers.

WHITE LEGHORNS.—Best American Utility Strains. Settings of Eggs for sale, from pure-bred utility White Leghorns, F.O.R., 10/6 per setting of 15. Cockerels, 10/- to 20/-. Terms, cash with order. Mrs. W. L. STEEL, Stellenbosch.

BUFF ORPINGTONS.—THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE. A TABLE BIRDS. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities. Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled Colonial strain of 10 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Address: A. C. BULLER, Dwarsriviershoek, Stellenbosch.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

*Healthy young man (South African) 18 years old wishes to take to farming. Would like to hear of good opening, has had over one year experience on mixed farm.—Apply B. Desvages (Chemist) 141, Loop Street, Cape Town.

Gentleman requires employment on a farm. Four years' experience in New Zealand, general farming. Reply—M.F. or Box 9, Cape Town.

THE Agricultural Journal OF THE CAPE OF GOOD HOPE

No. 2.

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VOL. XXXVI.

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CONTENTS.

NOTES	PAGE
Index and Title for Vol. XXXV. Abnormally Heavy Calves—Preventing the spread of the Codling Moth—Nurse Crop not best for Lucerne—Sponsziekte (Quarter Evil) Vaccine—Sorting for Codling Moth—Fattening Pigs—Distribution of Arsenite of Soda—Trout Fishing (New Regulations)—Bees important to Lucerne—The Mally Fruit Fly Remedy (A Brilliant Success)—South African Stud Book for 1909—"South African Poisonous Plants"—(By L. H. Walsh) (Illustrated).	142
THE POITOU MULE BREEDING INDUSTRY (Illustrated)	150
SHOW DATES, 1910	154
LUCERNE TYLENCHUS (Illustrated)	155
LOCUST DESTRUCTION, 1909-1910	158
IS SOUTH AFRICA DRYING UP?	167
FRUIT EXPORT FOR DECEMBER, 1909	170
RAISINS	171
RURAL CAPE COLONY (Illustrated)	179
RAMBOUILLET AND THE RAMBOUILLET MERINO SHEEP	198
SEED FOR EXPERIMENT	198
DISTRIBUTION OF WHEAT, OATS, AND BARLEY SEEDS FOR THE 1910 SEASON	216
STOCK BOOKS FOR FARMERS	217
EAST COAST FEVER	219
RETURN OF OUTBREAKS OF CONTAGIOUS DISEASES	225
DESTRUCTION OF PRICKLY PEAR	226
ANALYSIS OF FERTILISERS, 1909 SEASON	227
THE RATE OF DISTILLATION OF VOLATILE CONSTITUENTS IN THE MANUFACTURE OF PURE WINE BRANDY	231
MILK RECORD	235
CAPE FRUIT FOR AMERICA	236
LOSSES IN TRANSPORTATION AND STORAGE OF FRUIT	240
CAPE PRODUCE CONDEMNED IN THE TRANSVAAL	244
CORRESPONDENCE	247
Storing Ostrich Eggs for Incubation—Certain Death to Moles—Snakes and Ostriches—Eelworm in Lucerne (Tylenchus)—The Clarification of Honey—A Destructive Beetle—Circular Dipping Tanks.	
NOTES ON THE WEATHER OF DECEMBER, 1909	257
RAINFALL	263
CURRENT MARKET RATES	268
PRODUCE MARKETS	270

NOTES.

Index and Title for Vol. XXXV.

With this month's *Agricultural Journal*, the Index and Title Page for Volume XXXV. (July to December, 1909) is issued.

Abnormally Heavy Calves.

A couple of correspondents have lately directed attention to their abnormally heavy calves and now a correspondent from Vryburg points to what looks like the limit. He says that Prof. Robt. Wallace in his work on the "Farm Live Stock of Great Britain" mentions an Aberdeen-Angus calf born in 1906, the property of Mr. A. D. Mitchell, which measured 36 inches round the breast and weighed 164 lbs.

Preventing the Spread of the Codling Moth.

The attention of fruitgrowers and all others interested is directed to the amended Regulations promulgated by Proclamation No. 34, dated the 27th January, 1910, with a view to the prevention of the spread of the Codling Moth Insect (*Carpocapsa pomonella*) in the Cape Colony. While these amended Regulations in no way affect the prohibition at present in force on the introduction of apple, pear and quince fruits into the protected area comprised by that portion of the Colony lying south of and including the Districts of Tarka, Wodehouse and Barkly East and east of and including the Districts of Bedford, Albany and Alexandria, from any place beyond the boundaries thereof, it has been found necessary owing to the discovery of the Codling Moth insect in isolated localities within this area to regulate the removal of these fruits from point to point therein.

The following restrictions have therefore been imposed, viz.:—

1. The introduction by rail or otherwise of any apple, pear or quince fruit in its fresh state *into or through* the Cathcart District *from or through* any part of the Queenstown District is absolutely prohibited.
2. The removal of any apple, pear or quince fruit in its fresh state from the farm "Exwell" in the Cathcart District, except for immediate consignment northwards from Waku Station or except for immediate conveyance northwards from some point beyond the northern border of the Cathcart District is absolutely prohibited.

Nurse Crop not best for Lucerne.

The practice of sowing a nurse crop with alfalfa (Lucerne) was inaugurated (says Coburn in "The Book of Alfalfa") when the nature of the plant was not as well understood as now. It was also somewhat on

the theory too that "a half-loaf is better than no bread." It began when there was a good deal of doubt about "getting a stand," and the farmer thought no doubt that a crop of oats or barley would pay for the plowing even if the alfalfa failed. While the practice is continued by many, the prevalent latter method is to provide no nurse crop. Few who have abandoned the nurse crop have returned to it. The alfalfa plant does not need protection from the sun, nor is it bettered by dividing any of the soil moisture or fertility with another crop. On the other hand if alfalfa is sowed in the spring, it is important that it obtain an early start in order that its roots can quickly work down into the moisture of the sub-soil, against the dry days of July and August. When a nurse crop of any vigor is removed the alfalfa plants are likely to be found weak, spindling, and with little root growth; the nurse crop has also taken up some of the soil nitrogen needed by the young alfalfa; or if the nurse crop is heavy and has lodged, there will be left bare spots, where the alfalfa has been smothered out.

Cutting the nurse crop is likely to be attended with no little damage to the tender alfalfa plants by trampling their crowns into the ground, or breaking them off. Practically all the experiment stations favor sowing alone. With few exceptions the second and third years have brought heavier yields where no nurse crop was used. The theory that the nurse crop will prevent the weeds choking the alfalfa is apparently, as a rule, not well founded. In the first place alfalfa should not be sown on foul land, and in the second place proper disking and harrowing, at near intervals for four or six weeks before sowing, will disturb or kill far more weeds than can any nurse crop. Besides, the oats or barley sown as a nurse will when cut leave weeds in good growth, or dormant and ready to spring up as fast or faster than the alfalfa. No nurse crop is ever used with fall sowing. When ground has been properly prepared for the preceding crop, and then properly cared for, and made ready for the alfalfa by the preliminary weed destruction, it will be found advisable to sow alfalfa alone, even in the spring.

Sponsziekte (Quarter Evil) Vaccine.

It is notified for general information that Sponsziekte (Quarter Evil) Vaccine is now prepared at and procurable from the Veterinary Laboratory, Grahamstown, at the reduced price of Three Pence (3d.) per dose. All applications for this Vaccine must be addressed either to the Director of the Veterinary Laboratory, Grahamstown, or to the Civil Commissioners, *and must invariably be accompanied by remittances in cash, postal orders, money orders or drafts.* Cheques will not be accepted. Government Notice No. 737, dated the 2nd July, 1909, is cancelled.

Sorting for Codling Moth.

In connection with the sorting of Codling Moth infested fruit in Johannesburg the Department of Agriculture has been advised that instructions have been issued by the Transvaal Department of Agriculture permitting the reconsignment, for sorting, to Johannesburg of any fruit originally consigned to Pretoria and there rejected on account of being found infested with Codling Moth to the extent of under 5 per cent.

Fattening Pigs.

The constituents most desirable in feed for swine depend greatly upon the use to which the animal is to put them. A newly born pig's body is largely water, and to grow he must have food that will produce tissue. That is why the milk, primarily designed to furnish proper nourishment for growing animals, needs to be, as it is, so rich in nitrogenous substance. Later, when the time comes that he is intended for quick-fattening, he should, naturally, be supplied with feed containing much fat making material, and it is that quality which has given corn its high place in finishing hogs for slaughter. It is readily seen, therefore, that different kinds of feed will be needed to furnish the most beneficial results, according to the stage of growth of the animal, the energy required for its maintenance, and the end to which the animal is destined; yet it does not necessarily follow that a ration should be one-sided or be dominated by one element to the exclusion of a variety. Losing sight of this is a mistake that has been made more frequently in the use of corn (mealies) than any other feed; not so much, perhaps, because it is rich in carbonaceous matter, as by reason of its convenience and cheapness in the regions where it flourishes.—From Coburn's "Swine in America."

Distribution of Arsenite of Soda.

Arsenite of Soda for Scrub Extermination and cattle dipping purposes will be obtainable until further notice at any of the dépôts established for the sale thereof at a prepaid charge of £1 10s. (one pound ten shillings sterling) per drum of 112 lbs., delivered at the dépôt. The dépôts at present established are shown in the following list.

Colony Proper.

Aberdeen.—Civil Commissioner's Office.
 Adelaide.—Civil Commissioner's Office.
 Alexandria.—Civil Commissioner's Office.
 Bedford.—Civil Commissioner's Office.
 Cradock.—Civil Commissioner's Office.
 East London.—Civil Commissioner's Office.
 Fort Beaufort.—Civil Commissioner's Office.
 Graaff-Reinet.—Civil Commissioner's Office.
 Grahamstown.—J. H. Parker and Co.
 Humansdorp.—Civil Commissioner's Office.
 Jansenville.—Civil Commissioner's Office.
 King Willam's Town.—Civil Commissioner's Office.
 Murraysburg.—Civil Commissioner's Office.
 Oudtshoorn.—Civil Commissioner's Office.
 Port Elizabeth.—Civil Commissioner's Office.
 Queenstown.—Civil Commissioner's Office.
 Somerset East.—Civil Commissioner's Office, Somerset East, and
 Assistant Resident Magistrate's Office, Pearston.
 Steynsburg.—Civil Commissioner's Office.
 Steytlerville.—R. Levin.
 Stockenström.—Civil Commissioner's Office.
 Swellendam.—Civil Commissioner's Office.
 Tarkastad.—Civil Commissioner's Office.
 Uitenhage.—Civil Commissioner's Office.
 Willowmore.—Civil Commissioner's Office.

Native Territories.

Kokstad.—Resident Magistrate's Office.

Umtata.—Resident Magistrate's Office.

Umzimkulu.—Resident Magistrate's Office Umzimkulu; Poundmaster, Hilltop; Field-cornet Gold, Glengarry.

Trout Fishing.—New Regulations.

The following new regulations are gazetted under the Fish Protection Act of 1899:—

1. It shall be lawful to fish for Trout in the Berg, Breede, Eerste, Hex, Lourens, Bot, Palmiet and Zonder End Rivers and in any of the tributaries thereof and the Upper reaches of the Oliphant's River, situated on the farms "In Kruip," "Welgemeend," "Rosendale" and "Vischgat" between the first day of October in any year and the 15th day of January in the following year, both days inclusive, and in Verkeerde Vlei, in the Division of Ceres, and Princess Vlei, Ronde Vlei and Seacow Vlei, in the Cape Division, between the 15th day of September in any year and the 31st day of March in the following year, both days inclusive, provided the following conditions be observed.

- (a) That no person shall fish for trout of any variety without having first registered his name with, and obtained a permit from, the Resident Magistrate of any of the following districts, viz.: Cape Town, Paarl, Stellenbosch, Caledon, Ceres, Wellington, Tulbagh, Piquetberg and Worcester.
- (b) That the means employed for fishing for trout shall be rod and line only, and that artificial non-spinning fly only be used as a lure, which shall be dressed on a single hook not exceeding $\frac{3}{4}$ of an inch in length by $\frac{1}{4}$ of an inch across, except in the Princess Vlei, where spinning lures can be used, provided that such lures shall be mounted with not more than three single hooks instead of the usual flights of double or triangle hooks; and no nets or other modes of capture shall be allowed, but this shall not be held to exclude the use of a legitimate landing net or gaff for landing the fish caught.
- (c) That if any trout less than 10 inches in length be caught, it shall be forthwith returned to the water from which it was taken, with as little delay and as little injury as possible, and that the number of trout of 10 inches in length and over which may be caught by any person in one day shall not exceed 10.
- (d) That the consent of the owner on whose ground it is proposed to fish be first obtained. (In the case of waters situate within Forest Reserves a licence to fish must be obtained from the Forest Department in addition to the permit above alluded to.)
- (e) That the permit issued be produced for inspection when demanded by any member of the Police Force, Forest Officer, or other Government official, or by the owner of the property on which the holder of the permit is fishing.
- (f) That the permit be not transferable.

2. Notwithstanding anything to the contrary contained in Regulation 1 hereof, it shall be lawful for the Secretary for Agriculture, under such conditions as he may approve, to empower the Committee of any recognised Angling Society to issue permits to its members to fish for trout with flies exceeding the limit prescribed in Regulation 1 aforesaid in the District in respect of which such society is formed.

Such permits shall be in writing and shall be produced for inspection when demanded by any Officials or persons enumerated in Section (e) Regulation 1 hereof.

3. Riparian owners shall not require to obtain a permit to fish for trout in the open waters on their own property during the Fishing Season, but such fishing shall be otherwise subject to the conditions mentioned in Regulation No. 1 of this Schedule.

4. Any person or persons contravening any of the foregoing Regulations or any of the conditions thereof, shall be liable, on conviction, to a fine not exceeding twenty pounds sterling (£20) for each offence, and in default of payment thereof to imprisonment with or without hard labour for a period not exceeding three months.

Bees important to Lucerne.

It has been discovered that the honey bee is of even more importance to lucerne than lucerne is to the bee. The wonderful strength and speed of the bees take them long distances for their food and they have recourse to a great variety of plants. But the peculiar construction of the alfalfa blossom renders it unable to fertilize itself and its shape makes cross fertilization very difficult. In the marvellous "balance of good" in nature, alfalfa, like thousands of other plants, is aided in its lease of life by the insect world. It is not known just how many insects or birds assist this remarkable plant, but the honey bee is the most conspicuous, the most industrious, the most eager, and certainly the most useful. Careful observations have been made of seed pods grown near colonies of bees, and also of those so far from any bee colonies that it was safely assumed no bees had visited the fields producing the pods. In every case it was found that those from nearby fields had from 50 to 75 per cent. more seeds than the others and that they were larger and more perfectly developed. In Colorado and Western Kansas, where bee culture has been greatly developed in recent years, it is found that the alfalfa seed crop in fields nearest to bee colonies is much heavier and of better quality than that of fields but a few miles away. At the Kansas experiment station a small plot of vigorous alfalfa was covered just before coming into bloom with mosquito netting supported on sticks. It was therefore known that no bees nor other insects could come into contact with the blossoms. Later a careful examination disclosed that the pods which had formed were entirely without seeds.—From Coburn's "The Book of Alfalfa."

The Mally Fruit Fly Remedy—A Brilliant Success.

Mr. P. S. du Toit, Secretary of the Graaff-Reinet Fruit Growers' Association, writes:—In Graaff-Reinet—where never much value has been set on the theories and directions of Government experts, their theories sometimes seeming to be so mountain high and of such a spendthrift nature that they have no attraction for those who have seen the better

old times—they have obtained good results by bringing into practice the theory of Mr. Mally by making experiments in the spraying of peach trees with arsenate of lead and black sugar against the peach fly—(Fruit Fly). The local Fruit Growers' Association having induced them, the people ardently started applying a light spraying to the trees during the months of October and November, with the result that a very small percentage of fly-damaged fruit has been found. Where early spraying of pear and apple trees was started the crop has been a complete success.

We may add to the above that this process, proposed and perfected by Mr. Mally, the Eastern Province Entomologist, for the prevention of the ravages of fruit fly (*Ceratitis capitata*), though simple in the extreme seems to be one of the best schemes ever projected for pests of this nature. From all sides, both in the Eastern and Western sections of the Colony, we hear of nothing but success wherever it has been tried. Some growers are almost extravagant in their praises and attribute to it a remarkable salvage on the season's crops. The greatest danger in a case like this is in the thing being overdone. Not only is there the high probability of some people expecting too much from such a remedy, but there is the very prolific class that is never contented with the best, but is always anxious to improve on it. To such a mind a light spraying that accomplishes so much must necessarily give place to the virtues of a heavier dose. No greater mistake can be imagined. To assure success the lines laid down by Mr. Mally must be rigorously followed and always to remember that a small quantity of the spray is ample for the purpose. Full particulars with instructions appeared in the *Agricultural Journal* for November last (vol. xxxv., No. 5), and reprints are obtainable on application to the Government Entomologist, Department of Agriculture, Cape Town, and the Eastern Province Entomologist (Mr. C. W. Mally), Grahamstown.

It is interesting to note that, so far as can be ascertained, this remedy has proved quite harmless to bees. This should relieve the fears of some of our horticultural and apicultural friends who have trembled for the future of their profitable and useful allies. It is also worthy of note that a remedy on similar lines is coming into use in Europe, and is reported to be highly successful against the ravages of a fly which attacks olives in the same manner as that adopted by the fruit fly against peaches. It is also highly probable that this remedy will prove equally efficacious for the fly pest which produces maggots in pumpkins, melons, marrows, etc., and causes such heavy losses in these garden crops. In fact it would appear that Mr. Mally has evolved an exceedingly valuable pest remedy, which should materially assist the producers of such crops as are mentioned above in guarding against the heavy losses they have hitherto suffered from insects of the nature of the fruit fly, and has thus rendered a great service to the country.

South African Stud Book for 1909.

We have to acknowledge with thanks the receipt of vol. iv. of the South African Stud Book. This exceedingly valuable compilation is deserving of much greater support from the stock farmers of South Africa

than it is apparently receiving. The book is divided into sections, which gives an air of local emulation, as each section is devoted to one of the Colonies. These include the Cape, which appropriates some 150 pages, the Transvaal with 56 pages and the Orange River Colony with 53. It is to be regretted that Natal is not included as there must be a large number of pedigree animals among the breeders of that Colony, whose presence in the country is thus obscured. The book is well printed and strongly bound and should be in the possession of every stock farmer in the country. With the advent of Union the work of the body responsible for its publication—the South African Stud Book Association—should be considerably widened and strengthened. We wish that body every success.

"South African Poisonous Plants." (By L. H. Walsh.)

We have received from the publishers (Messrs. T. Maskew Miller, Cape Town) a copy of a very interesting little work from the pen of Mr. L. H. Walsh entitled "South African Poisonous Plants." It is the first attempt, so far as we know, to deal with this subject entirely by itself



PLANT CAUSING C'NENTA.—(*Cotyledon Ventricosa*, Burm.). A. Round tops of stem. B. Fleshy, cup-shaped leaves. Habitat—Somerset East. Scale: About half natural size.—From Walsh's "South African Poisonous Plants."

as a separate question for discussion. We have published from time to time a good deal of information on the general question, and this Mr. Walsh has, rightly, not hesitated to use. The late Mr. Duncan Hutcheon, M.R.C.V.S., devoted a good deal of attention to the pathological side of the question so far as it affected his veterinary work, but always regretted that he was not in a position to institute thorough and complete investigations with the object of clearing away the mists which have gathered about its various phases. Mr. Walsh was struck with the importance of the

subject while travelling in the North-Western Districts of the Cape, which offer so fruitful a field for the enquirer into these matters. He made his enquiries and noted the results, the outcome of which is the work before us. Mr. Walsh confines himself entirely to the farm-stock side of the question, and his notes are well worth reading. A valuable feature of the work is the illustrations, which give a good idea of the various plants described. The published price is one shilling, and considering the amount



ANOTHER C'NENTA PLANT.—(*Cotyledon Eckloniana*, Harv.). 1. Stem and leaves. 2. Flower stalk, in two portions, from same plant. A. Stump of flower stalk. About one-third natural size.—From Walsh's "*South African Poisonous Plants*."

of valuable information it contains one wonders how it is produced at the price. It is admittedly but a beginning, and the author hopes it may act as a stimulus to further and more careful research. Herewith, by courtesy of Mr. Walsh, we reproduce a couple of the blocks.



Photo by]

Mr. J. Rawbone's Prize-winning Ayrshires at Stellenbosch.

[A. Keyzer.

THE POITOU MULE BREEDING INDUSTRY.

Owing to the very great importance mule Breeding may have in a country like ours, our correspondent, Mr. S. M. Lewin, M.S.A.F., an old Cape colonist, has communicated the following Paper on "Mule Breeding in France." It is a faithful translation of a Paper read by Monsieur Rozeray, Professor of Agriculture in Niort (France) at the International Agricultural Congress of Rome (Italy) last year. It is needless to add, that owing to the nature of the subject and its paramount importance Monsieur Rozeray's paper was received with the greatest interest by all those who were present.

The breeding of the Mule in the Province of "Poitou," seems to date from a rather remote epoch. According to "Ayrault" in the Xth Century, William the IV., Count of Poitou, was asked for a mule by a Catholic priest named Léon. If the history of the Poitou mule industry is comparatively recent, its evolution is easy to follow; as it dates from the XVIIIth century only. From that time the business has always been prosperous notwithstanding the many difficulties which were thrown in its way. For instance in 1717, the administration of the Government Stud Stations issued prohibitive rules against the mule industry in France. However, having come out victors from the struggle which was engaged in at different times by the supporters of the war horse, the mule breeders, as stubborn as their product, succeeded in disarming their adversaries who admitted, with the best grace, that the Poitou hybrid was indispensable in mountainous countries and also in hot and damp climates.

CAUSES OF THE SUPERIORITY OF THE POITOU MULE.

The selection of the best Jackasses, the most suitable mares which are especially bred in the province of Poitou, the locality, the various methods of breeding, the climate and the soil, are all factors conclusive to the production of powerful animals, defying all competition, and give the French province of "Poitou" the monopoly of the production of the heavy "draught mule."

GEOGRAPHICAL AREA.

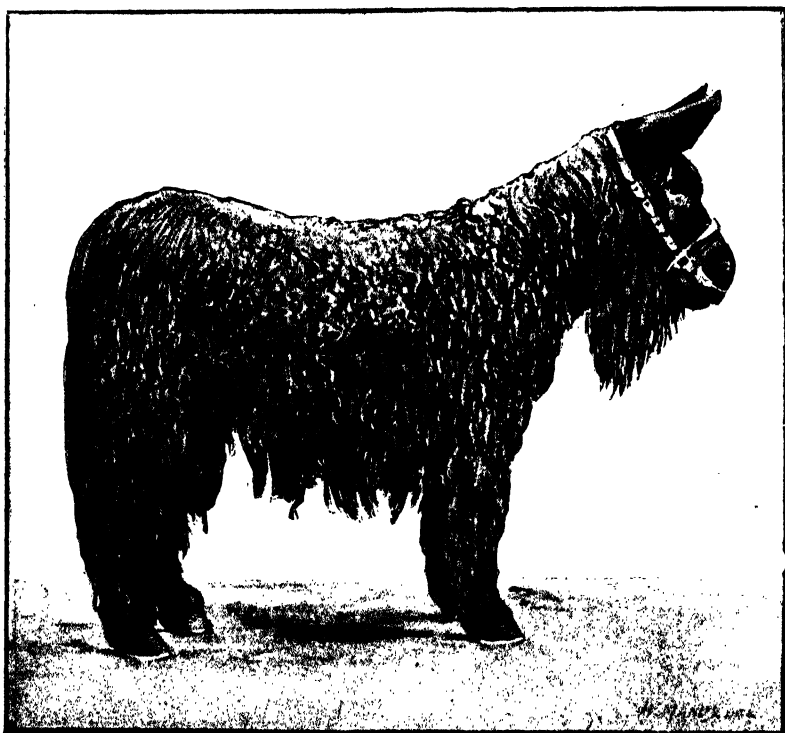
The "Poitou" mule breeding industry is limited to the districts of *Melle Niort* and to the south and north westerly parts of *Parthenay*, in the province of *Two Sevres*, also to the south westerly part of the *arrondissement* of *Fontenay le Comte* in the province of *Vendée*, and to parts of the provinces of *Vienne* and of the *Two Charentes*. It is in the latter zone where mules of a smaller size were obtained, that the production was somewhat considerably reduced, because the breeding conditions were less favourable than at the actual birth place of the mule breeding species (the districts of *Melle*, *Niort*, and *Fontenay le Comte*).

The 5 ft. 6 in. mule and over, good for heavy draught work, in the southern parts of France, and also suitable for the ploughing of the vineyards of the southern districts, is the type which is mostly bred in the "Poitou" mule breeding centres.

The French breeders have had to contend with a very strong opposition from the U.S.A. breeders who with thoroughbred Jackasses which were imported from France allowed them to obtain very big but also very weak mules which were not able to do the work entrusted to the shorter but much stronger French mule especially in hilly countries.

THE POITOU JACKASS.

The mule breeding sire, also known by the generic name of Jackass, is by its size, the most powerful of the species (from 56 to 63 inches). His proportions are also very ample. The head is very large, the ears very long, wide and full of hair, the neck is very thick, the chest very broad and deep, the body is long and barrel shaped, the members are thickly set and the articulations very strong. The livery is of a dark brown, bay or black colour, and consists of woolly hair often curled, the hoofs are thick



TYPICAL POITOU JACKASS.

and the heel broad. The long Jackasses have the reputation of breeding strong mules. The French Jackass is too advantageously known abroad to necessitate further comment, they have been exported all over the world, and every country in quest of the pure strain invariably sends to Poitou for it, for it is only in France, that owing to its climatic conditions and to the proper knowledge breeders have of that specie, that the finest specimens are obtainable. The breeding of the "Jackass" is mainly due to consanguinity or to the in-and-in-breeding, a method which has made Bakewell so famous amongst British breeders. The atavic power which the Jackass possesses to the utmost degree is one of the characteristics of the breed. The jackass is only bred by a few breeders of the districts of

Melle and Niort, the industry is transmitted from father to son, who faithfully keep the secret of breeding. The limited chances of getting a male product lessens also the number of "jennies" for the reproduction of the breed, for not only are as many females born as males, and only the latter ones fetch good prices, but the indifference and often the carelessness which is shown in the rearing of the "jennies" contributes to bring about great risks during the gestation, and causes a great number of females to abort or miscarry.

That limited production has always contributed to keep up the prices of good jackasses. They vary from £120 to £240, and upwards, for as much as £500 was paid for jackasses of elite laureates at local agricultural shows, which were exported to South America.

MULE BREEDING MARES.

The "Poitou" mule breeding mare is a big and powerful animal of an average size of 65 inches. It should have a long head and ears, a long and powerful neck, long and slanting shoulders, prominent withers, a straight back, a long and barrel shaped body, very broad hind quarters, very thick members and articulations, a voluminous hoof and a well spread heel. In one word, what is required to breed a strong mule, is a powerful mare with harmonious or symmetrical lines. In that respect the Poitou breeders have obtained through a careful and most rigorous selection that special type of mares which is most apt to be fertilised by the jackass.

Contrary to the general belief, we think that if there should be a scarcity of good Poitou mule breeding mares, which, however, we know is not the case, by importing tall and powerful mares having much resemblance with the Poitou species, strong mules could be obtained all the same. We think we have shown the important part which is thus played by the mare in the breeding of the mule. Weak and small mares will only throw out a small and weak progeny no matter how powerful is the jackass who may have served them.

LOCALITY AND METHODS OF BREEDING.

The locality and the methods of breeding favours very much the action of the sires, be they stallions or jackasses. In fact the mule breeding region, is comprised in a small proportion of alluvial deposits of celtic marshes and of jurassic plains. The breeding industry stretches very little on the granitic part of the region, the fertility of a well cultivated soil and the proximity of the sea, are accountable for a grazing of good quality and for the production of a nourishing forage. The dampness of the soil and of the air in these marshes much contributes towards the development of the hair of the jackass, and much increases also the width of his hoofs. It seems that very great importance is attached to these secondary characters which, however, are as easy to produce as to suppress. Nevertheless, they are very favourable points, as the best animals are generally judged by the development of their hair and by the size of their hoofs.

The progeny which is born in the spring finds an ample supply of milk, and when the weaning period approaches the young mules are fed to artificial forage, and when 15 or 18 months old they are allowed to graze on lucerne, sanfoin or clover, and then they are trained to the plough with an old mare, only very light work being given to them at the start.

That healthy exercise much develops their muscles and appetite, and the good treatment which they receive makes them the tamest animals of their kind.

At the age of 3 years the mules are prepared for sale. Well cared for in dark stables, they are well fed, so that the good condition in which they are sold will allow them to bear the fatigue of an exportation abroad.

In fact we see that the powerful mule of Poitou, that giant amongst its kindred, is the progeny of the "Jackass," the predominant factor of the Poitou industry allied to heavily boned, thickly set and very symmetrical mares.

IMPORTANCE OF THE POITOU MULE BREEDING INDUSTRY.

More than 20,000 mares are served annually by Poitou Jackasses, and about 7,000 by stallions in the mule breeding centres of Poitou.

The young mules are either bought on the farms or on the markets or fairs in the districts of Melle and Niort from November to January by mule dealers, who forward them afterwards to various places in France.

Nearly all the males go to the south easternly provinces, the majority being castrated, those of large size are kept entire and become heavy draught mules, and are selected for rough and heavy harbour work. They may be seen in the principal French harbours, where they are much admired for their powerful size. Very big prices as a rule are paid for these large animals.

A good half of the mares which are served by Poitou Jackasses are generally fertile. Their number varies, still from ten to 12,000 young mules are born annually in the province of Poitou.

Poitou mules are usually sold when $3\frac{1}{2}$ or $4\frac{1}{2}$ years old, the strongest are recruited for the cultivation of the vine in the provinces of "Aude," "Herault," "Gard," and "Pyrenees Orientales"; the average price paid for them at that age varies from £40 to £80, according to their size and also to their merit.

A staunch advocate of the mule and a highly qualified military veterinary surgeon, Monsieur Guenon, in one of his works "The Mule" has described the qualities of that precious auxiliary of the man in hilly countries and the services the army derives from it.

From his sire the mule inherits the sobriety, the longevity, the endurance and the resistance to heat, drought, and the dampness which so often have proved so deadly to the horse.

Physiologically the mule is not subjected to the same diseases nor to as many diseases as the horse, and therefore its value in unhealthy countries is absolutely matchless.

ENCOURAGEMENT TO THE MULE BREEDING INDUSTRY.

Acknowledging the great services the mule renders to all branches of public economy, the administration of the Stud Stations in France has taken under its own patronage the mule breeding industry, to which it has allotted special grants and awards, which have done so much to increase its development.

STUD BOOK.

The "Stud Book" has contributed in a large measure to the improvement of the mares, stallions and jackasses, and also to bring forward the purest types or specimens, the subjects of the best origin who are doing so much towards the perfection of the breed.

BREEDING SYNDICATES.

With a view to advertising the mares, stallions or jackasses who are the principal factors to which the mule owes its existence, a syndicate of mule breeders was created in the province of Poitou in 1902. The activity

of the Board has had a most salutary influence over the transactions of that body which have been on the increase since its foundation.

IMPROVEMENTS.

A very old but much uncalled for custom will have it that in Poitou a "Jackass" notwithstanding the excellence of his pedigree is not reckoned of good origin unless he wears an unsightly shaggy fleece of very long, thick and kempy hair. It is a very gross mistake for which ignorance and the denial of all hygienic laws are alone accountable.

If that old and stupid custom was done away with the mule breeding industry would much gain by it, and become yet more prosperous.

SHOW DATES, 1910.

The following corrected list of show dates for 1910 is supplied by the secretary to the Agricultural Union (Mr. A. A. Persse, Parker's Buildings, Capetown):—

Robertson : February 9.
 Caledon : February 11.
 Ceres : February 15.
 Britstown : February 15 or 16.
 Queenstown : February 15 and 16.
 Riversdale : February 16.
 Malmesbury : February 17.
 Beaufort West : February 17 or 18.
 Rosebank : February 22, 23, 24, and 25.
 Molteno : February 23 and 24.
 Bathurst : February 24 and 25.
 Umtata : February 24 and 25.
 Aliwal North : March 8 and 9.
 Graaff-Reinet : March 1 and 2.
 Middelburg : March 3 and 4.
 Dordrecht : March 4 and 5.
 East London : March 4 and 5.
 Cradock : March 8 and 9.
 Cathcart : March 8 and 9.
 Humansdorp : March 9 and 10.
 Grahamstown : March 10 and 11.
 Port Elizabeth : March, 15, 16, 17 and 18.
 Butterworth : March 18.
 Johannesburg : March 29, 30, 31, and April 1.
 Oudtshoorn : March 30 and 31.
 Kokstad : March 30 and 31.
 Bloemfontein : April 12, 13 and 14.

LUCERNE TYLENCHUS.

In the note under this heading in the October issue of the *Agricultural Journal*, a promise of an extended article on the subject was made. Owing to the unavoidable non-completion of observations which it is desirable should be included in a full article, the preparation of one has not yet been undertaken; but as it is highly advisable that parties who may be about to plant lucerne be cautioned to avoid introducing the pest, this second warning note is issued.

The pest is an almost microscopic, whitish worm which infests above-ground parts of the plant. It may have a number of generations in the course of a year, but if the conditions become unfavourable to it, it may rest in a dormant condition for many months at a time. It can come to rest in cut lucerne and be restored to activity at a distant date, when perhaps the lucerne that contains it has gone with manure on to other lucerne fields. Bits of stem that contain it may be blown about and thus lead to establishment in previously clean fields, and soil or rubbish in which it has come to rest may be spread by farm implements, the feet of animals and in other such ways.

South African experience clearly shows, however, that the pest is chiefly spread with lucerne seed. The circumstantial evidence that this is the case is overwhelming, and whereas fields in which only high-class imported seed has been used are clean almost without exception, fields sown during the past few years with seed grown in the older lucerne districts of the Colony seem almost as often as otherwise to be more or less infested. So far as has yet been determined, it is impracticable to distinguish infected seed from non-infected seed, and impracticable to destroy or remove the infection without killing the seed. It is known that the pest enters onion seed in Europe and the highest authority on the subject, after close study, announced that he could not tell an infected seed from a normal one. Seed from badly-infested plants, however, produced some infested seedling plants. Onion seed can be disinfected, it is said, by soaking it in dilute sulphuric acid. Lucerne seed, unfortunately, itself succumbs if subjected to the treatment.

The Government had Mr. T. F. Dreyer, a South African who is studying in Germany, visit the chief lucerne districts of France during the past season to learn what he could about the pest. Mr. Dreyer ultimately reported that he failed to find it in French lucerne fields, but that it gave some trouble in lucerne in parts of Germany, where, however, seed was not grown for sale. The French Department of Agriculture has since sent an assurance that the worm is not a pest in lucerne in its country. These facts, taken in conjunction with the fact that colonial fields in which only imported seed has been used are almost invariably clean, indicate that one is unlikely to introduce the pest with high-class Provence (French) seed. By "high-class" is meant an article that has been cleaned by a reliable seedsman.

Farmers may not know that most of the Provence seed imported into South Africa is obtained from English seed houses. The better English houses take great care in the cleaning of their supplies, chiefly to eliminate dodder and weed seeds, and their operations must diminish any chance that *Tylenchus* accompany the lucerne. The writer expects to be able to prove positively that infection of *Tylenchus* is *within* the seed and that it would go with the seed from a much-infested field however carefully that seed were cleaned; but he believes that when a stand of lucerne is only very slightly infested, as seems probable is the case in Provence when the pest does occur there, the chief danger is from bits of dirt and stem. The cleaning of the seed practised by the best seed houses removes most of such foreign matter. In a recent letter, one of the firms wrote:—

"As a result of our enquiries we think there need be no fear of *Tylenchus devastatrix* being imported in the lucerne seed if buyers will only take care to buy the finest quality re-cleaned seed. . . . We are keeping a record respecting the average purity, germination, weight per 1000 grains, the presence of dodder and *Tylenchus devastatrix*; although we have had many samples tested, some as we receive the seed, others after we have cleaned it, so far we have only found *Tylenchus devastatrix* present in two samples, and one worm only in each case on particles of dirt in the seed before it had been re-cleaned by us. We are attaching great importance to the weight per 1000 grains, as you will understand the heavier this is, the better quality the seed must be. It is generally accepted that the bolder grained the sample is the better the crop will be."

There seems a chance that some relatively harmless worm was mistaken for *Tylenchus*, but it must be accepted that the dealer shows by his letter that he believes the pest may accompany Provence seed, although he thinks the risk is slight indeed and that it is largely removed by careful cleaning.

In general, high-class imported seed is, doubtless, safer to sow, as regards *Tylenchus*, than unselected South African-grown seed. But in the writer's opinion the best and safest seed for the South African grower to use, when he can make sure of getting it, is seed grown in this country in fields which are free of *Tylenchus* and other communicable troubles. Many farmers can supply their needs from their own farms, and others can purchase from farms which, by enquiry or personal inspection, they find to be above suspicion. Doubtless, too, some fully reliable dealers will be able to guarantee that what seed they offer was grown in clean fields. In this connection it may be mentioned that the leading Oudtshoorn merchants have been urged by the writer to exercise the most scrupulous care in buying seed for sale, and requested to caution prospective buyers in regard to the pest.

The infestation is most noticeable in the first crop of the season. Lands, which appear to be very badly diseased then may seem to have recovered almost completely two months later. The explanation is that the pest makes most headway during the winter and early spring whilst the plant is growing feebly or not at all, and a great deal of the infestation may be removed with the first cutting. The second cutting of the season from a much infected field may appear to be quite satisfactory; but the recovery through the summer is more apparent than real, and examination will show that an increasing number of shoots are succumbing and that the growth of tops from a diseased stool is not nearly so heavy as from a normal stool. When spring comes again the gradual development of the trouble is likely to be only too manifest.

Fields which it is proposed to spare for seed production had best be inspected just after growth starts in the early spring. Infested stools then easily betray themselves by their sickly appearance and relatively feeble growth. The typically-infested stool is much swollen and stunted.



LUCERNE TYLENCHUS.—Tips of Lucerne Plants showing typical swellings, indicating the presence of innumerable worms, in the immediate vicinity of seed pods.

Its surface is generally slightly wrinkled and more or less discoloured where the thickening occurs, and its pith is brownish. The worms are usually numerous in the discoloured pith and under the affected surface, but they are so minute that one can hardly make them out without a good magnifying glass. After the lucerne grows up the symptom of the trouble which is apt to catch the eye first is a blanching of the terminal leaves. In inspecting a field during the summer when the growth prevents the crowns from being seen at a glance, therefore, one should watch sharply for whitish or abnormally pale tops. White tops do not by any means necessarily indicate the presence of Tylenchus, but when they are seen one should examine the plant for stem swellings. Any part of the stem, from its base to its very top, may be swollen in the characteristic way described above, and the thickening may extend for several inches or only for a fraction of one inch. Affected stems, as a rule, bear few or no seeds, but sometimes one is able to find swellings close up to and even beyond the side stems that bear seed pods. One should inspect all parts of a field, not a corner or a side only, as it is common for the infestation to be in more or less isolated patches. A grower who wishes to be well on the safe side had best avoid taking seed even from an apparently clean field that is only one or two years old if the field was grown from seed that was much open to suspicion, or if the field is on a site where lucerne formerly failed from an obscure cause. The young field might, perchance, be infected, but not to a sufficient extent to attract attention.

Oudtshoorn farmers are inclined to make light of the Tylenchus. They can afford to because their district has already become widely infested and because under their conditions of farming lucerne with ostriches the pest does not seem to work as great havoc as it has shown itself capable of doing under the conditions prevalent in some other districts. It will be many years, perhaps, before it is clear how serious a pest the Tylenchus is, and meanwhile farmers will do wisely to avoid unnecessary risks of introducing it with seed, and also with manure, and those that have it in some fields but not others should as far as possible avoid acts which might carry infection into the clean ones.

Infested land should be planted to some other crop for a few seasons. Trouble should be taken to extirpate any lucerne that survives the ploughing, for odd stools that are left are likely to establish bad centres of infestation very quickly after the land is planted again to lucerne. In Europe the Tylenchus infests a great variety of plants besides lucerne, but it is said to change slowly from one plant to another. For this reason it probably does not matter much what are used as intervening crops. It would seem best for South Africans to plant what is known will do well after lucerne and can be utilised to the best advantage. Maize is likely to be the most common choice. Tylenchus is sometimes very destructive to rye, onions and other crops in Europe when these are grown year after year in the same soil; but it is not a pest that is much dreaded because crop rotation is ample to hold it in suppression. The fact that lucerne is there grown as a rotation crop, and not as a permanent one as most growers of it would have it here, is very likely the true explanation of its lack of importance as an enemy to this crop in Europe.

In conclusion it is again notified that the Government Entomologist, Department of Agriculture, Cape Town, and the Eastern Province Entomologist, Grahamstown, will report by post on any specimens of lucerne, suspected of being infested by Tylenchus, submitted to them by growers. Several whole stools, cut off at the ground level, should be sent.

LOCUST DESTRUCTION. 1909-1910.

INVASION BY BROWN LOCUSTS (*PACHYTYLUS SULCICOLLIS*).

WORK DONE IN THE CAPE COLONY.

REPORT OF THE CHIEF LOCUST OFFICER.

The Cape Colony was again invaded by large swarms of Flying Brown Locusts in the early autumn of 1909. According to information collected by the Government Entomologist, Mr. C. P. Lounsbury, they originated principally in Gordonia, the first swarm being reported from there on the 10th March, 1909. On the 16th March large swarms crossed the Orange River at Pella and Upington and for over 200 miles along the river. From the 14th to the 17th swarms were passing Kenhardt. Some reached Carnarvon on the 17th and 18th, and the southern part of Calvinia district, and the northern parts of Fraserburg and Sutherland districts at the same time. By the 27th, swarms had passed through the mountains into the Buffels River Valley in the western part of the Great Karoo, and had extended far into Aberdeen and Murraysburg districts. On the 29th swarms were at Middelburg and Graaff-Reinet, and later the extension of the infected area was slower, but gradually the pest spread further south and east and included the northern parts of Willowmore, Steytlerville, Jansenville and Uitenhage districts, and eastwards through Somerset East, Cradock, Steynsburg, Queenstown, Tarkastad, Bedford, Adelaide, Fort Beaufort, Victoria East, King William's Town right on to East London, and south-east through Albany, Peddie and Alexandria, depositing their eggs in all these and many other districts. The air line traversed by the swarms was fully 500 miles, and the course followed must be far greater. The area invaded or passed over, reckoning all the territory included, which lies within lines connecting the outermost reported occurrences, is about 125,000 square miles. The deposit of eggs has proved to be greater than we were led to anticipate. This is owing to an unfortunate state of affairs, namely, the laxity on the part of many farmers in failing to observe or to ascertain if eggs are laid on their farms. The Police are under instructions to enquire at every farm for information as to locusts, and to report regularly to the Agricultural Department where eggs are known to have been laid and to what extent. The Government uses these reports as the basis of its preparations for fighting the pest, and the farmer should therefore be careful to give reliable information to the Police. Many farmers do

not at present appear to realise that they can most materially assist the Department in preparing for a locust campaign by regularly reporting when eggs are deposited on their farms.

In connection with this I might mention that the Police have rendered most useful assistance in collecting information.

MONEY VOTED.

A sum of £3,000 was voted for the campaign, and owing to the fact that operations were being conducted in thirty districts in the Cape Colony, this amount was soon found to be inadequate. In order therefore to guard against running short of supplies, it was deemed advisable to terminate the services of all the District Locust Officers and to devote the balance of the available money towards keeping up the supply of poison and pumps for the farmers.

At that time Locust Officers had only just got into touch with the farmers in their respective districts. Fortunately the Government was able to authorise the expenditure of a further sum of £750, and this permitted of the services of the Locust Officers being continued and the work being soon in full swing again; and I can safely say that the good results fully justify their re-instatement. Subsequently the expenditure of an additional £1,000 was approved of. At the time of writing this Report, complete figures are not available to show the exact amount expended on the campaign, but approximately it amounts to about £4,500; this sum includes railage, which account amounts to over £1,000. This, compared with the value of the crops saved throughout the country, to say nothing of pasture, can be justly regarded as money judiciously spent. The services of all the District Locust Officers were terminated by the 30th December, with the exception of De Aar and Britstown, which two districts were worked by one officer, whose duties terminated on the 6th January; some of the Districts were closed down early in December.

SUPPLIES.

In past years the Government distributed Arsenite of Soda and Sugar separately to farmers to mix themselves. This year, as the result of experiments conducted by Mr. Lounsbury, a ready-mixed solution was issued in drums containing one and a half gallons of Arsenite and Treacle, full directions as to diluting, stirring, etc., being printed in English, Dutch and Kafir on the label of the drum. This ready-mixed solution was issued with the object of making it easier to handle, and consequently more attractive to the farmer, which object was certainly achieved.

At the commencement of the campaign several complaints were received from farmers in various districts, to the effect that the poison was ineffective, inasmuch as it would not kill locusts. This was soon traced to the fact that the minute directions given on the drums were disregarded, and the contents of the drum not stirred, which is most essential; the ingredients being liable to settle, makes thorough agitation necessary. Some farmers also, who like to see the locusts succumb a few minutes after partaking of the poisoned vegetation, complained that it was not effective, but upon it being explained to them that while some may die almost immediately, others take 12 to 24 hours, and even longer, they were satisfied, and the poison was soon in great demand and eagerly applied for by all enthusiastic supporters of the cause.

USING POISON STRONGER THAN DIRECTED.

There is a great tendency among farmers to use the solution stronger than directed by the Government, principally through a desire that the locusts should die immediately. The danger of this practice has in most instances been pointed out to them, and besides, locusts which have died from eating vegetation which has been poisoned according to directions, are a valuable food for, and harmless to, stock. Thus, by using the poison stronger than directed, the danger to stock is considerably increased and the poisoned locusts are rendered useless as an article of food. There are, however, instances when it is advisable to mix the poison slightly stronger than directed; namely, when a very large swarm of locusts is fast approaching cultivated land and green food is used as bait. In such cases practical experience has shown me that by soaking the green fodder in a stronger solution of poison, you are able to stop the progress of the swarm sooner and more effectually, and with far less green food than you would otherwise require. Of course great care must be taken that any green food which is not consumed by the locusts is picked up and disposed of. This practice of using the poison stronger than directed should, however, as I have said before, only be resorted to when locusts are approaching a cultivated land in overwhelming numbers.

A Central Depot for supplies was established at Rosebank under the management of an official styled "Officer-in-Charge, Locust Supply Depot," and while this arrangement worked very well and the supplies were forwarded and hurried on as fast as possible and requisitions from the various districts were responded to with commendable promptness, I consider that it would greatly facilitate and expedite matters if the Depot could be more centrally situated, say, at Naauwpoort or Rosmead Junctions, for by having the supplies more in the centre of the field of action a great saving of time and transport is accomplished.

The principal reason for having the Depot this year at Rosebank was to facilitate supervision of the work of mixing the ingredients (a new departure) in order that good results might be assured.

About seven weeks after the campaign was started there was a shortage of locust poison, which lasted only for about a week and which raised a great outcry among the farmers. I would like to emphasize the fact that this shortage was really not the fault of the Department, in fact, I make bold to say that I lay the blame at the farmers' door for this reason, namely, when preparations are made for a locust campaign one naturally bases such preparations upon information at hand with regard to the severity or seriousness of the anticipated outbreak. Now, as I have said before, if the farmers would only take the required amount of interest by reporting to the Department when, and to what extent, eggs are deposited on their farms we would have definite and reliable information to work on, and arrange for an adequate supply of poison and pumps to combat the outbreak.

Practical experience has over and over again proved to me that it is a simple matter, I repeat, a simple matter, to exterminate voetgangers in the early stage of their existence. I have myself, on several occasions, poisoned as many as two large swarms of voetgangers in the "fly stage" (that is when small as flies) before breakfast. All that a farmer has to do is to instruct his boys, especially the herds, to report immediately when they see locusts hatching out, and then proceed to spray them at night or in the early morning. A great and deplorable mistake which many farmers make is to leave the locusts unmolested until their cultivated lands are threatened, forgetting and losing sight of the fact that

these cultivated lands are the meeting place of the different swarms, which instinctively make for the green crops. Then, instead of having to deal with individual swarms, you have a moving mass of locusts, comprising several swarms joined together, the killing of which is indeed a heart-breaking task, and one which in reality should never have been, for had these locusts been attacked when they hatched, they never would have reached this stage. In a few words, attacking a swarm of voetgangers in the earliest possible stage is a great saving of time, labour and poison, and the secret of a successful campaign.

QUANTITY OF SUPPLIES RECEIVED, ISSUED AND ON HAND.

	Received.	Issued.	On hand.
Pumps	1,513	1,501	12
Drums of Poison	8,950	8,395	555

Of the above-mentioned pumps 350 were purchased this season, the remainder being second-hand pumps left over from previous campaigns.

Besides the above-mentioned supplies there are still on hand at the Depot:—

265 bags of Sugar.
18 drums of Arsenite of Soda.

There are still many drums of poison in the various districts which are included in the total of 8,395 and which will not be called in, so that in the event of further hatching this season they will be available for immediate use.

SUCCESS OF THE CAMPAIGN.

I can conscientiously say that the Locust Campaign has been a great success. The majority of the farmers co-operated well; several, who on former occasions through religious and other scruples refused to fall into line, have been converted and did excellent work, and I am pleased to be able to say that the assistance rendered by the Government in the cause of locust destruction is greatly appreciated by the farmers and is generally recognised as money well spent. This year splendid work was done in many of the North-western districts, especially in Victoria West, which district alone accounted for 2,252 swarms. This greatly relieved the Southern districts from a fresh invasion after destroying their own locusts, and while splendid work was done in nearly all the districts, special mention must be made of Philipstown, which district, without the assistance of a locust officer, accounted for 1,267 swarms of voetgangers. The Police in this district especially, at the instigation of the Magistrate, Mr. Giddy, rendered yeoman service and contributed largely towards this successful result.

The outbreak of voetgangers in the Cape Colony this season has proved far greater than was ever anticipated; in fact, greater, from all accounts, than any previous season. While some swarms escaped and reached the flying stage, I can safely say that the locust birds, which are reported to be numerous in a good many districts, will be easily able to cope with these, and unless the Colony is again invaded by flying locusts from the desert, there will be no outbreak of any serious nature next season.

There are several farmers in various districts who did yeoman service to the cause of locust destruction, some accounting individually for over a hundred and fifty swarms. This shows what can be accomplished if a man will only put his shoulder to the wheel.

Very good work was also done by several of the Town Councils on Town Commonage ground, 57 swarms having been destroyed on Bedford Commonage and 67 swarms on the Victoria West Commonage.

The following table shows the districts wherein operations were carried out, number of officers engaged, and number of swarms destroyed.

LOCUST OFFICERS ENGAGED AND NUMBER OF SWARMS DESTROYED.

District.	Number of District Locust Officers engaged.	Number of swarms destroyed.
Aberdeen	1	1,539
Adelaide and Fort Beaufort	1	397
Albany, Peddie and Alexandria	1	1,108
Beaufort West	1	176
Bedford	1	866
Britstown and De Aar	1	1,155
Carnarvon	1	146
Colesberg	1	581
Cradock	1	649
Graaff-Reinet	1	446
Hanover	1	912
Jansenville	1	63
King Williamstown, East London and Kongha	1 with 2 Assistants	731
Middelburg	1	700
Murraysburg	1	269
Philipstown	Nil.	1,267
Queenstown	1	148
Richmond	1	94
Somerset East	1	680
Steynsburg	1	90
Tarkastad	1	428
Uitenhage and Steytlerville	1	152
Victoria East	1	457
Victoria West	1	2,252
	23 and 2 Assistants	15,306

From the above it will be seen that 23 D.L.Os. and 2 Assistants were appointed, and a total of 15,306 swarms destroyed. This total only includes swarms which are actually shown on the Locust Officers' weekly returns, and as many of the officers were only engaged for a period of from six weeks to two months, the services of all being terminated at a moment's notice, it can well be understood that it was quite impossible for them to include all the swarms destroyed in their various districts, especially as destruction of swarms was still being carried on by the farmers after the termination of the services of the District Locust Officers. I have not, up to the present, been able to ascertain the number of swarms destroyed by the Railway Department, which has rendered us willing and useful assistance throughout the Colony. The locusts destroyed by them are, therefore, not included in the total. I

feel certain that the total number of swarms destroyed will run well into 20,000 or 25,000. The Locust Officers in the South-eastern part of the Colony who have very large Native Locations in their districts, had very up-hill work in trying to stir up enthusiasm among the Natives, who at the commencement of the campaign rendered very little assistance and the Locust Officers had even to cart water and poison in their own carts to destroy voetgangers in the Native areas. The Magistrates also did all in their power to point out to the Natives the gravity of the situation, and urged them to do everything in their power to assist the Government in destroying the voetgangers, but the response was, on the whole, disappointing, and it was only through sheer determination and perseverance on the part of the District Locust Officers that the Natives did eventually, towards the end of the campaign, render assistance.

The swarms which reached the flying stage in the East mostly originated in the Native Locations and the latter appears to a large extent to be the breeding ground for the locusts in the East. While touching upon locust destruction in the Native Locations, I would like to mention that useful voluntary assistance was rendered by Mr. Julius Andreka, of King William's Town, who was most indefatigable in rendering every assistance to the cause and deserves the thanks of the Government.

Many more enthusiastic converts to the Arsenite remedy have been made all over the Cape Colony, and while other miscellaneous measures were used, such as trampling with small stock, burning in dry grass where practicable, various sheep dips, soap and gas lamps, the Arsenite remedy was generally resorted to and recognised as the most economical and effective means of extermination, especially as farmers are realising that if the Arsenite is properly used and ordinary precautions are taken, there is no danger as far as stock is concerned. It is quite possible, in fact probable, that further hatching may take place this season on some farms in a few districts where, owing to insufficient rain having fallen, the whole egg deposit has not been able to hatch out, but it is fully expected that should this happen, the farmers concerned will rise to the occasion and help themselves, and further carry out the work of extermination which the Government has brought to such a satisfactory pitch.

Poison and pumps are being left in the various districts in order to be near at hand in the event of such further hatching taking place.

There is a slight tendency among farmers to expect too much from the District Locust Officer. They seem to think that because he is a paid individual he must, single-handed, carry on the work of destruction, losing sight of the fact that each officer has an average of well over 300 farms to visit, some having more than double that number. However, as I have said before, on the whole, the farmers co-operated very well, a fact which is substantiated by the success of the campaign. There is a very general feeling springing up among a large percentage of the farmers that locust destruction in the Cape Colony should be made compulsory, and this will have to be given serious consideration in the future, for it is doubtless very discouraging to a man who does his level best to destroy, while his neighbour, through religious and various scruples, or perhaps because he happens to be purely a stock farmer, forgetting that his pastures are just as dear to him as the cultivated lands are to an agricultural farmer, refuses to take any steps or to co-operate in any way in the destruction of locusts.

With reference to the man who regards the destruction of locusts as an unpardonable sin, it is both amusing and incomprehensible to see how he will calmly, flag in hand, take steps to turn a swarm of voetgangers on to his poor unfortunate neighbour, who has perhaps for days been

doing his utmost to destroy locusts in order to save his hard-earned crops, and will then go and sit down, washing his hands with invisible water and imperceptible soap, congratulating himself that he has done a wonderfully smart and highly humane act, losing sight of the fact that he has largely contributed towards robbing his neighbour of his daily bread. Indeed, a humane act!

BAIT FOR LOCUSTS.

In the Midlands and especially in the Northern and North-western districts, green food soaked in the locust poison and distributed in the line of march of the locusts was greatly resorted to, in preference to spraying the veld, on account of the scarcity of grass and dryness of the vegetation generally. This means of extermination has undoubtedly proved a great and unqualified success, especially if the green food is soaked over night, for being already charged with moisture, it naturally does not absorb the poison as readily and quickly as a dry substance would. If it is then finely chaffed and put in grain bags, it can be taken on horse-back and used to destroy with comparative ease swarms which are miles from the homestead and water. The bait being finely chaffed, that which is not consumed by the locusts will not be picked up by stock.

Bran soaked in poison has been used by several farmers and has proved to be excellent bait, and is greedily devoured by the locusts. Being dry it quickly and readily absorbs the poison. If purchased in bulk from the wheat-growing countries it may be obtained very cheaply, and will, I am sure, assist most materially in solving the difficulty of fighting the voetgangers in the extreme North-western districts, especially in the inaccessible parts as far as vehicular traffic and scarcity of water is concerned. The bran should be soaked in the locust poison, and when dry, compressed into bales, an enormous quantity thus going into a very small space, and the danger to stock would be nil, for if properly distributed on the ground it is impossible for them to pick it up. In parts of the extreme North-west, where, as I have said before, vehicular traffic, owing to the thick desert sand, is an ever puzzling problem and an expensive item, the compressed bran could be loaded on to pack mules or donkeys, and an enormous quantity, by this comparatively simple means, could be taken up to what is undoubtedly the seat of the trouble. The fact of steps being taken to combat the pest up in the desert would, I am sure, have a good moral effect upon the farming community in the Cape Colony, and would act as an additional and encouraging stimulant to them to increase their efforts to assist the Government in dealing with this most vital and important question.

Various other baits were used, among which may be mentioned horse manure and dead voetgangers steeped in the poison. Locusts are notorious for their cannibalistic tendencies and readily devour their own kind, especially when sweetened with the solution. In connection with this, it might not be out of place to mention a little incident which happened to me while performing some experiments on one of Dr. Smartt's farms in the Britstown district, where, thanks to the kindness and courtesy of Mr. Every, one of the "Smartt Syndicate" Managers, who rendered me most useful assistance, I was able to carry out a series of experiments in connection with testing the efficacy of various strengths of the poison. I took two separate bags of green food, finely chaffed, which had been soaked over-night in two different strengths of poison, and fed two distinct swarms of voetgangers about 16 days to three weeks old, about a quarter of a mile apart. After scattering the contents of one bag to the first swarm, which will hereafter be known as swarm A, and which

was quite twice as large as the other one, I proceeded to the second swarm, which will hereinafter be known as swarm B., and scattered the contents of the other bag to them. The green food in this bag, I might mention, had been soaked in double-strength poison, viz.: 1 in 25. I then sat down, watch in hand, to await results, my object being to ascertain a correct percentage of dead locusts at a given time. After waiting for a period of an hour and thirty-five minutes, the voetgangers at swarm B were beginning to die. A large percentage were fast sickening and, prior to finally succumbing to the effects of the arsenite, were taking refuge in the surrounding Karoobushes as they always do, especially when the sun is hot, as it was on this occasion. About ten minutes later, what should I see but another swarm, which eventually proved to be part of swarm A, fast approaching, and as soon as they reached swarm B, they immediately with great relish devoured their dead comrades and also those that had sickened to such an extent that my experiment, as far as obtaining a correct percentage of dead locusts at a given period was concerned, was a failure, and I had to repeat same again the following day. I must add that upon proceeding to the site where swarm A was fed, I found that a large percentage of them had remained on the spot, a good many being dead and the rest sitting in the surrounding bushes also sickening fast. I also noticed a heap of heads and legs lying about, showing that their comrades who had moved off to swarm B had also, prior to their departure, brought their cannibalistic tendencies into play and eaten a good many of their companions before leaving. Swarm A, as before stated, was twice the size of swarm B, and the green food was apparently not sufficient to destroy the whole swarm, hence their being able to move off as they did and, needless to say, after devouring swarm B, together with the green food which was left over, they moved no further, and the rest of the destruction was practically an automatic process.

STOCK POISONING.

Cases of stock poisoning, I am pleased to say, were fewer this season than during the campaign of 1907. This is no doubt due to the fact that farmers are becoming more familiar with the use of the Arsenite.

The poisoning cases which were reported were all, without exception, traced to absolute carelessness on the part of the parties concerned, and a tendency to use the poison very much stronger than directed without exercising a corresponding amount of care. These losses, though comparatively few, are none the less regrettable especially as some of them were sustained by farmers who did splendid work. Another unfortunate feature with regard to stock poisoning is that most absurd and sensational rumours are spread which do the cause a great deal of harm. One case in point was reported to me, wherein it was alleged that a certain farmer in the Bedford District had lost 18 head of cattle merely because they had partaken of locusts which had died from eating sprayed vegetation. Upon personal investigation I found that the cattle in question had in reality eaten a large quantity of green barley which had been soaked in a solution of poison mixed to a strength of 1 in 20, which is more than double the prescribed strength. The green food was placed on the ground in heaps, the cattle having free access to it, with the above-mentioned result. Numerous reports show that poisoned locusts have been fed to ostriches and stock with impunity. No reports of locust birds or any other birds dying from eating poisoned locusts have been received.

LOCUST BIRDS.

Numerous locust birds, both the large white stork (*Ciconia Alba*) and the small locust bird (*Glareola*) are reported to have made their appearance in several districts and are doing good execution among the swarms that escaped and reached the flying stage. A white stork was accidentally shot on a farm at Senekal on the 3rd January, a ring being found on its leg inscribed "Arnith Kospont, Budapest, Hungaria," which serves as another proof of the extraordinary migratory habits of this bird.

Game birds of all kinds were protected by the Government in the locust-infected areas during the locust season, which was a very wise step, as it is an admitted fact that guinea fowls, partridges, paaus, korhaans, spreeus and many other birds, which are the natural enemies of the locust, assist most materially, especially in the Eastern Districts, in the work of destruction, guinea fowls and partridges especially being splendid at scratching up and eating locust eggs. I know of a guinea fowl being shot in the Albany District, in whose crop, upon being opened up, thirty-seven locusts were found.

An interesting feature in this season's outbreak which was brought to my notice, and one which I feared might prove serious, was that the swarms of young fliers which had escaped destruction in the Bedford District were already pairing, and upon investigating the matter I found this statement to be correct, and on carefully examining the females I found distinct traces of the formation of eggs, and immediately wired the Government Entomologist to that effect, who replied that he did not anticipate a second generation this season, in spite of the unusually early pairing. I thereafter, at his request, forwarded him a box of live specimens for examination and experimental purposes.

RED LOCUST (*CYRTOCANTHACRIS SEPTEMFACIATA*).

No report was received of voetgangers of the above species having made an appearance in any part of the Cape Colony.

In conclusion, I would like to refer to and tender my thanks for the useful assistance rendered by the Magistrates of the various Districts, the Police, the Railway Department and last, but not least, to the staff of the Agricultural Department for the valuable assistance rendered me by their prompt attention to every detail in connection with the work.

ALFRED VAN RYNEVELD,

Chief Locust Officer.

Cape Town,
January 20th, 1910.

IS SOUTH AFRICA DRYING UP?

Mr. F. H. Barber, of Greenhills, Grahamstown, writes:—It has for a long time been a subject of much discussion and controversy as to whether South Africa is drying up, or not, and whether the rainfall is decreasing? To outward appearance this seems to be the case, although there are people who keep statistics and rain charts, who declare that it is not so, but that we have periodical cycles of dry and wet seasons. But there appears to be several great predisposing causes to warrant one in the belief that the rainfall is decreasing, and that the country is drying up, or at any rate, that it is a much drier country than it used to be. It is, however, necessary and interesting to go back a good long way, and review the natural and physical conditions and changes that have taken place before and since its occupation by the white man, and one of the great predisposing causes of drought seems to have originated in the Kalahari Desert.

In 1875, I went on a hunting expedition to the Zambesi, about two hundred miles north of Bamangwato (Shoshong). The road skirted the eastern shores of the great "Makarrikarri" salt pan, the pan was dry. One morning across the apparently limitless expanse of pan, we descried in the hazy distance some phantastic mirage of giraffe and some of our young "innocents abroad" marched off in pursuit. Towards evening they returned, having walked the greater part of the day over the dry pan, the giraffe having spirited themselves away in the mirage. One morning, a day or two afterwards, to our astonishment we found the pan covered with a film of water several inches deep. There had been no rain and this extraordinary phenomenon naturally excited much wonder, curiosity, and comment. Later, I met an old Dutch hunter and questioned him about it, and during our conversation elicited from him the following extraordinary story:—He said the "Makarrikarri" salt pan, the Lake N'gami, and the Yunga, or Batletle river which connected them, were all absolutely on a dead level, as also all the central plateau of the country surrounding. That the water was blown about from one side to the other, according to the prevailing winds, that sometimes with continuous east winds it would blow down the Yunga towards the lake, and vice versa. He also said that the "Okovango" or "Cubango" river, a large stream coming from the north west, formerly emptied itself into Lake N'gami, and when the lake was full drifted along the "Zanga" in an easterly direction, finally escaped in a southerly direction towards Anderson's Vlei and thence dispersed south into the Kalahari. But that the river had changed its course, in this wise:—Thousands of natives used to do a great trade in ivory, grain, etc., with a big chief living on the Lake N'gami, and used the "Okovango" as a water way, making huge reed rafts and floating themselves and produce down the river. Near the Lake was an estuary where the rafts lodged, and were deserted. Thousands of rafts collected and ultimately formed a weir or barrage across the

river, diverting its flow in a northerly direction into great swamps, finally finding a new channel into the "Chobe," and thence down the Zambesi. That Lake N'gami is drying up is well known.

Now, I do not vouch for this story being true, I simply state what I was told, by more than one hunter, but there is a good deal of evidence to encourage one in the belief that there is truth in this theory, for the following reasons.

In 1895 H. M. Barber, Russell Bowker, Bertram White and I crossed from Vryburg through the South Kalahari, to Rietfontein, on the border of German territory. We travelled down the Mashowing river, a dry bed, once without doubt a strong and permanent river, as shown by a deep and broad channel, water worn rocks, and pebbles. About three hundred miles west of Vryburg we struck the dry channel of the "Molopo," like the Mashowing a great watercourse, with water worn rocks and pebbles, also, no doubt, at one time a strong running river. About ten miles up the river another large channel comes into it from the north. The "Nosop," further east was another, all with similar physical conditions. Now, none of these rivers ever run now, not even in the rainy season, but in 1891 or 1892 a great flood of rain fell near Kuruman, and swept down the Kuruman river, and the Mashowing, finally lodging in the sand hills of "Abequas" pits, where it formed a lake that held water for a few years, and then dried up. Along the banks of the Mashowing were thousands of magnificent "Kameel" thorn trees, *all dead*, died probably when the river ceased to flow, a great while ago, but preserved by the intense dryness of the climate, like the ancient monuments of Egypt. So there seems to be very little doubt but that, at one time the Kalahari was intersected with strong flowing rivers, swamps, lagoons, vleis, more trees, more vegetation, more evaporation, more moisture, and more rain!!! And this would largely affect our own climate and rainfall.

Now the question naturally arises, what has become of the waters that flowed down these many and great water courses. Surely the rainfall has not so much decreased as to cause all these once strong permanent streams to cease, and conjecture can only lead us to believe that the old Boer's story was true, and that the O'Kovango river draining a great area of tropical and rainy country at one time watered and nourished the present dry and waterless Kalahari. If this is not the case, then I strongly contend that the argument is very strongly in favour of those who believe that the rainfall is decreasing (and pretty rapidly too), and that the country is drying up.

Another, and a more recent cause of droughts is at our own doors, and we are responsible for it.

About the year 1783, the great French Ornithologist (birdman) Le Valliant, visited South Africa, on a bird collecting expedition. Fitting out his wagon, or wagons in Cape Town he pioneered his way through what now are the districts of Caledon, Swellendam, Heidelberg, Riversdale, George, Knysna, Humansdorp, and Uitenhage. Crossing the Zuurberg and the little Fish River near its junction with the great Fish river, he pitched his camp on the banks of the latter, just about opposite to where our old friend, Mr. (Taak) Delpoort now resides. Having fixed up his camp, he went out to shoot some game, and walked along the banks of the river. He first tried to get a shot at a Hippo, but could not, owing to the dense reed beds that flanked the side of the river, which he described as a beautiful clear stream running level with its bank. Large pools and reaches extended for miles up and down. Hippopotami, crocodiles, flamingos, cranes, storks, pelicans and wild fowl of varied descriptions abounded, innumerable, and he described the country

as a beautiful one, covered with rich grasses and shrubs. Gordon Cumming, Burchell, Cornwallis, Harris, Anderson, and the old pioneer Boers describe it in like manner further north, and it was difficult to see and shoot the smaller game, for long grass.

What a metamorphosis is there now!

The beautiful clear reed bound river has become a dry sandy slood, like the "Molopo" and the "Nosop," and the long deep pools are substituted by level sand beds (a typical race course). The verdure spread veld has become an arid wind swept waste, where the half starved tortoises, sad eyed, listlessly drags his weary body, from one half dead Karoo bush to a distant other.

After Le Valliant came the white man with his flocks of cattle, goats and sheep. He is the culprit who unwittingly ruined the country by overstocking and the kraaling of stock, and brought to this pitiful condition this once fair land. He pitched his camp and built his house near some permanent water, and his ever increasing flocks, as herbage became scanty, marched further and further afield, gradually extending their grazing area. Towards evening they marched homeward again and gradually deposited huge dung hills on the "werf." The best grasses were eaten up, pulled out, trodden out. The rich surface soil was trodden loose, sloods, cattle, sheep and goat tracks radiated like a fan from the homestead. Then came the thunderstorm. The rich surface soil manured by decomposed vegetation was swept in muddy torrents down deeply trodden-out stock paths to the rivers, and the clear and deep pools were filled up with sand and mud.

This system of gradual impoverishment, detrition and denudation has been going on for nearly a hundred years, until we have in the place of the beautiful land described by Le Valliant the dry and arid wastes of to-day.

The veld described by the old travellers was covered with rich vegetation which checked, and soft untrodden soil which absorbed, the rainfall. The ground was shaded with healthy plants, bushes and long grasses, and remained damp; the rain that fell was held back, and absorbed. Permanent springs flowed in every valley, spreading reedy rivers, swamps, lagoons, vleis and kuils occurred everywhere. By evaporation the air was humid and damp, and there was a natural affinity and attraction for passing cloud and mist. It could rain easier and oftener and more, and did.

Now, I do not pretend to offer any expert or original advice as to the best methods of getting things right again, as this is a pretty tall order, and if I did I should probably be accused of "trying to teach my grandmother how to suck eggs." But we know what the veld used to be like, and we have got to assist nature to recover her former conditions as much as we can, and that is, to check, keep back and retain on the veld every drop of water we can.

Progressive farmers are hard at the job now with dams, weirs, and irrigation works, camps to rest the veld, where reduced numbers of improved breeds of stock can graze and roam about at their own sweet will, instead of being driven backwards and forwards to heap up unsightly dung hills at the "werf." But a few swallows don't make a summer, nor will a few progressive farmers make a climate. It has got to be a universal job, and if we have lost the "Okovango" river we have got to get it back, or an equivalent, in our own strong running rivers the Orange and the Vaal, and divert them in a great arterial system of canals and furrows, and flood the great, dry rich soils of the central Karoo. Some £20,000,000 has been spent in Egypt in bringing out the Nile, a lucrative and paying enterprise, also in India, and let us hope that

under the United South African Government we shall soon have these great examples followed, the results of which would be so great and far reaching that not only might the rainfall be increased but the physical conditions of the country so improved that should Le Valliant ever have a reincarnation and find himself on the banks of the Fish River opposite old (Taak) Delpoort's farm, he might even recognise the scene of his camp.

He certainly would not now!

Since writing the above the Grahamstown Journal has issued a report, taken at the "Goal" of the rainfall since 1878 to 1909, inclusive, a period of 32 years. From 1878 to 1893 for 16 years the total rainfall was 503.64 inches. From 1894 to 1909 for 16 years it was 428.30 inches, a difference of 75.34 inches. Now when one considers that evolution works slowly, and that Grahamstown's chief supply of rain is coastal, and not so much affected by the physical conditions that prevail further inland, the decrease shown by these figures is considerable.

FRUIT EXPORT.

Return of Fruit Shipped from Cape Colony during December, 1909

Port of Shipment.	Destination.	No. of Packages.	Description of Fruit.	Quantities.	Value.
					£ s. d.
Cape Town ...	German South West Africa	2	Grenadillas...	800	0 11 6.
" ...	" ...	23	Plums ...	5,100	7 11 6
" ...	" ...	50	Peaches ...	7,988	12 17 6.
" ...	" ...	31	Pears ...	8,080	15 0 0.
" ...	" ...	24	Lemons ...	5,380	22 16 6
" ...	" ...	72	Apricots ...	15,740	17 5 6
" ...	" ...	102	Oranges ...	21,930	68 8 0
" ...	" ...	68	Pineapples ...	2,192	24 4 4
" ...	" ...	41	Bananas ...	34,550	37 14 0
" ...	" ...	123	Apples ...	36,480	200 10 0.
" ...	Lobito Bay	2	Apples ...	500	1 2 2
" ...	" ...	1	Oranges ...	100	0 7 6
" ...	" ...	3	Peaches ...	432	0 18 0
" ...	" ...	3	Plums ...	1,008	0 18 0
" ...	" ...	1	Pineapples ...	48	0 6 0
" ...	France	5	Peaches ...	66	0 5 6
" ...	England	200	Plums ...	7,872	22 9 0.
" ...	" ...	1,257	Apricots ...	37,391	167 9 6
" ...	" ...	4,119	Peaches ...	104,335	752 14 0
Port Elizabeth	" ...	9	Pineapples ...	630	3 0 0.

RAISINS.

By Dr. A. J. PEROLD.

During the past few years a genuine national spirit has come more and more to the front in our fatherland. More and also more generally Afrikaners have recognised that our own products deserve our preference over those imported from abroad. The spirit of the time being favourable, we must take care that our own products occupy that place amongst us to which they are entitled. In order to obtain that, it is necessary to take into consideration the progress which up to the present has been made in other countries of the world and, wherever expedient, to make use of it in order to have our own products make a good figure, when being compared with those of other countries, that they may, even without special protection, retain their position in that competition with foreign products. Further still, we must offer our products to the world's trade in such a good state that they may favourably compete with those of other countries. Of course, there are generally only certain kinds of products for a country wherewith to compete favourably in the commerce of the world against other countries. In my opinion our country should certainly be able to compete with other countries in the preparation of raisins for the trade of the world, if we would only take some trouble to produce a better class of raisins. At any rate we must apply ourselves to the preparing of the best raisins possible. No one will be able to say later on that he has not known about it, for the useful and practical lectures of Mr. P. J. Cillie (commissioned by our Government) to wine farmers, and the following lines, amongst other things, will make such an excuse impossible to all people who *want to know* how to make good raisins.

The first practical question to treat of here is that of the different *varieties of grapes* which may be made into raisins. The four most notable varieties are: (1) *Almenuear*, of which the best and most expensive Malaga raisins are made: (2) *Muscat of Alexandria* (our *Hanepoot*), of which in Malaga the common and better-class Malaga raisins are made and which are mostly used throughout the world to make raisins: (3) *Corinth*, of which chiefly in Greece the Corinth raisins are made, and finally (4) *Sultanine*, of which chiefly the famous Smyrna raisins are made.

With the exception of the first-mentioned variety, I think that we have all the other kinds here. For raisin production we will have to attach the most importance to Nos. 2 and 4 varieties, of which we have planted a fairly large quantity already.

In this brief summary I only wish to discuss the preparation of the two well-known kinds of Hanepoot raisins, viz.: the "lye raisins" and the "Malaga raisins."

The following has been partly derived from my own experience, acquired in Malaga (Spain), and partly from that excellent publication "*Les raisins secs en Tunisie*," of Minangoin and Couston, Tunis, 1907.

A. LYE RAISINS.

This being the most generally known class of raisins with us, they will be first discussed.

And this is the first question:

Where are you going to dry the raisins?

In our country, as well as in Greece and other countries, many raisins are simply dried on the ground. The surface of the ground is first of all usually watered, rolled and beaten down so as to make it hard. Further, the ground is treated once or twice with cattle manure in order to make it still harder and smoother. The great disadvantage of this system is that it is so difficult to protect the raisins against wind and weather. This and many other considerations make it extremely desirable to dry raisins only on "stellasies." The best are thin wooden "stellasies" (or trays) which are light and small. The same trays may also be used for the drying of other fruit. "Stellases" of reed would give irregularly-pressed fruit, which is undesirable. A further advantage of light wooden "stellases" is that it will not be necessary during the drying of the raisins to turn each bunch separately, but simply to press the empty one on the full "stellase" and carefully turn the two, in which way one turns all the bunches simultaneously. This is particularly of advantage when labour is scarce and wages are high. I hope that anyone wanting to prepare raisins for sale will buy or make himself such wooden "stellases," because this is one of the essentials for being able to supply a first-class product. Let us see now how many "stellases" a man will want during the season.

In Tunis 5 to 8 square metres were wanted for the drying of 100 kilograms of grapes, which works out at $6\frac{1}{2}$ square yards per 220 lbs., or 4 baskets of grapes of 55 lbs. each. Suppose now these "stellases" being made 6 ft. x 3 ft., then one "stellase" has 2 square yards of drying space and will hold therefore one basket of grapes at a time. For 1,000 Hanepoot vines, which will yield about 100 baskets of grapes, about 100 such "stellases" will be required. But seeing one can, on an average, use the same "stellases" three times during a season for lye raisins, one will require 100 such "stellases" for 3,000 vines, or 300 baskets of grapes. This ought to yield you the third part of 300×55 , or 5,500 lbs. of raisins. With 400 "stellases" one ought therefore to be able to make about 11 tons of raisins from 33 tons of grapes or 1,200 baskets of 55 lbs. each, or the yield of about 12,000 vines.

These figures are based on the experience of Tunis. Our "Hanepoot" bunches being on an average fairly large, we will be able to dry about $11\frac{1}{2}$ baskets of grapes on a "stellase" of 6 x 3 ft., and will require only 300 "stellases" for the making of 11 tons of raisins.

In Tunis as a rule the ground where the "stellases" with the raisins are placed is mostly protected against the winds in order not to have the grapes drying too quickly, and at the same time to have them protected against dust. For that purpose mostly double Prickly Pear fences are planted around the ground with the necessary openings for the "stellases" to be carried out and in. It would be well to have these openings closed by a solid gate. A slight hang towards the North will be the best situation for a drying ground, the sun standing with us in the afternoon in the north and the rays of the sun falling almost perpendicularly on the "stellases," whereby the raisins will dry as quickly as possible.

LYE OF ASHES, OR LYE OF SODA OR POTASH?

This is a question which in this country has been put many a time. The common experience is that raisins which have been prepared with soda or potash are liable to retain a flavour of lye. That, however, is only due to the *lye having been too strong*. The man who wants to work with caustic or common potash or soda, should weigh the required quantities precisely so as to obtain a good result. Lye, on the other hand, which has been prepared from ganna-ashes or from any other kind of ashes will not so easily be made too strong, because the soda, and especially the potash, contained in it, is only present in small quantities.

Already in the first century of the Christian era the well-known Roman agricultural author Columella wrote in his work "*De Re rustica*" (i.e., "*On Agriculture*"), about lye for raisins that it had to be prepared by boiling ashes of vine-cuttings in water in a boiler or earthenware pot, and pouring in a little olive oil of the best quality as soon as the lye boils.

In the twelfth century the Moor Ibn-el-Awam, in Seville (Spain), has given the following recipe in his "*Ketab-el-Felahah*," or "*Book on Agriculture*," for the preparation of lye for raisins:—"Put the ashes of large beans (*boerboontjes*)—stalks and leaves—in a clean pot and add four times as much fresh water (by weight) and leave it for a few days. Afterwards pour off the clear fluid, put that in a copper boiler and light a fire underneath it: as soon as the lye is boiling pour in a little olive oil of good quality and dip then for a little while a ratan basket of grapes in the boiling lye." He remarks further that *the addition of good olive oil improves the quality of the raisins*.

In Smyrna raisin lye is made according to the following formula:—

Ashes of oak or vine-cuttings	20 lbs.
Good olive oil	1 lb.
Water	100 lbs. (or 10 gallons).

Here mostly the ashes of gannabush are taken, which give a strong lye. But we might as well take the ashes of vine-cuttings for the lye. For instance, on the island of Pantellaria (south of Sicily) before the raisin curing season a lot of lye is prepared in the following manner:—"Heat 40 gallons of water in a big boiler to near boiling point; mix in 60 lbs. of ashes of vine-cuttings; bring to a boil and stir the mass well with a stick; now leave off boiling it and pour the fluid in a cask with the end out, in which it is allowed to cool and settle. The following day draw off the clear lye in a cask, in which it is kept for the time it is required."

Till now we have only discussed lye of ashes. The question now remains, what about lye of potash or soda? Well, for the inexperienced man it is decidedly better, for the reasons already mentioned, to prepare his lye from ashes of vine-cuttings or of gannabos.

In their work, already quoted, Minangoin and Couston give the following formulæ:—

- (1) 1 lb. of caustic potash is mixed into 20 gallons of warm water and stirred.
- (2) 1 lb. of caustic soda is mixed in 28 gallons of warm water and stirred.
- (3) 6 lbs. of common potash or carbonate of potassium is mixed in 20 gallons of warm water and stirred.

In Smyrna, according to Mr. Léon, the Sultanas are dipped in the following lye:—

Potassium carbonate	6 lbs.
Water	10 gallons.
Olive Oil	more than 2½ bottles (or 0.44 gallon)

Of course care has to be taken in any case that the potash or soda which is used is clean and *dry*.

I repeat again the warning: that people who are not prepared to handle potash and soda very carefully should *rather use lye of ashes* in order to secure a good result. In any case it will be desirable to make this year experiments with this addition of good olive oil to the lye in order to find out whether this has a favourable effect on the quality of our raisins.

The next point of great importance is:

When are the grapes to be cut?

The first essential is that the grapes should be ripe. To determine that, the sugar in the grapes has to be determined from day to day by means of a saccharimeter. As soon as the sugar does not increase, the grapes are quite ripe and may be cut. Only fully ripe and *sound* bunches should be gathered. All diseased and broken berries should be carefully removed before dipping the grapes in the lye. It is evident that at the cutting and the whole time till they lie on the trays *the grapes have to be handled with the utmost care*. The best way is to cut the bunch near to the stick and to touch only the stalk and not the bunch. The bunch is then placed carefully in the basket, which should be *shallow*. As soon as the basket is filled it is taken to the lye-kettle. There should be a table, at which women and children are sitting, who should take the bunches of grapes that have just arrived from the vineyard one by one by the stalk and cut out carefully with scissors the bad and broken berries. These cleaned bunches are then packed in the lying-baskets and dipped in the lye.

The caustic nature of the lye dissolves the waxy bloom which covers the berries and which would mar the evaporation of the water of the berries. At the same time the berries expand under the action of the heat, which bursts the skin, not being able to stretch itself, in a number of places. The formation of these cracks has been prepared by the caustic action of the lye. The lye is of the right strength when the berries are *full of small cracks*, after having been immersed *for only a few seconds* in the nearly boiling lye. The grapes should not be kept too long in the lye, because else big cracks will be made and such raisins will not have a good appearance. Great attention has to be paid to the outward appearance of the raisins, because this will exert its influence later on the selling price.

The basket is now taken out and kept for a little while above the boiler that most of the lye may drain off. Thereupon it is taken to the "*stellasies*," where the bunches are carefully laid open. After the raisins have been drying for a day it will be well to turn the "*stellasies*" round that the drying may be more even. After 2-3 days the upper half of the bunches will be fairly dry. Then *they have to be turned* that the other half of the bunches may dry more quickly. With suitable, small, wooden "*stellasies*," the same as they have in California, this is very easy. There an empty tray is pressed against the full one and both turned at once. Otherwise each bunch will have to be turned separately, which gives much more labour. This turning is of the utmost necessity to obtain a good

raisin, as, if it should not be done, the upper part of each bunch would be *too dry* before the part underneath is sufficiently dry. After about five days the raisins should be about right. *Raisins do not mean grapes as dry as hay.* Usually good raisins contain still about 20 per cent. of water. By allowing one's raisins to get over-dry, they lose considerably in quality as well as in weight.

COVERING UP DURING THE NIGHT.

It is of the utmost importance to keep all raisins which are drying covered up during the night. Half-an-hour before sunset the "stellasies" should be covered to prevent dew falling on the raisins. Should this not be done the raisins get soaking wet during the night and in that case the sun has to scorch the raisins half of the forenoon in order to get them as dry as they were the night before. The result will be that the raisins will take much more time to dry and that, when finished, they will have a much *darker colour* than otherwise would have been the case. Everyone knows what a harmful effect this has on the price of the raisins. Any maker of raisins should therefore provide the required tarpaulins to have the "stellasies" covered during the night. These should not be taken off earlier than *an hour after sunrise*. The best will be to stack the "stellasies," put an empty one on top and then cover the stack with a "bokzeil" (which has been made waterproof by means of boiled linseed oil). If not, such a "bokzeil" has to be tented about 1½ feet above the "stellasies." It is extremely necessary to cover and uncover exactly at the given time.

In discussing the Malaga raisins we will see how this is done in Spain. In Tunis they start after the lapse of from four to five days to pick up the sufficiently dry bunches, and after seven days everything has been dried and gathered. *What is dry should be taken up at once.*

The weight of the raisins is generally one-third of that of the grapes.

It will be a good plan not to put the raisins—after they have been picked up—in *too thick layers*, because they are liable to sweat too much and so to get sticky. *Good raisins should not be sticky.* Such, however, may easily happen in case the bad and broken berries should not be cut out before the grapes are dipped in the lye.

PACKING.

Of the utmost importance is the manner in which the product is offered to the trade. And here attention has chiefly to be given to two matters: (1) to use small cases and (2) to make them, with contents and all, acceptable to the eye. It will always pay to *sort* the raisins—say in three classes—and to pack those of the first class in cases of a capacity of about 5 to 10 lbs., those of the second class in cases of about 20 lbs. and those of the third class in kegs or cases of 50 to 100 lbs.

In Tunis the cases are made locally of wood of half-inch in thickness, and those which are to contain about 80 lbs. are about 9 inches in depth, 1 ft. 8 inches in length and 1 ft. 1-inch in width. For such a case one will require about 15½ running feet of a plank which is about half-an-inch thick and 6 inches wide. In Tunis such a case costs about 9d. For the better class of raisins the cases have to be lined with fine white paper and on top to be covered with lace-paper. The paper in direct contact with the raisins has to be vegetable parchment, which is also used for the packing of fat and butter. That will cost about £1 10s. per 100 lbs. The money expended on paper and other ornaments is more than compensated for by the increased selling price.

In the case of lye-raisins care has also to be taken that as few of the berries as possible get detached from the bunches, because raisins in bunches are higher in price and more in demand than loose raisins.

B. MALAGA RAISINS.

As the name indicates, these raisins are made chiefly in the province of Malaga (Spain). The annual export of Malaga raisins from that district amounts to about 3,500 tons in boxes containing at the utmost 22 lbs. In Melilla and California also already a fairly large quantity of Malaga raisins is made. Contrary to lye-raisins, the grapes in this case are not dipped in lye, but dry simply just as they have been cut from the vine. As previously mentioned the best of all Malaga raisins are made from the variety Alumnecar, while Hanepoot (white) is the kind of grape from which by far the most—and excellent ones, too—Malaga raisins are manufactured. These vines look exactly like ours—I mean the Hanepoot. They are standing at Campanillas (in the neighbourhood of the town of Malaga) mostly in sandy river-soil, which is fairly loamy and fertile. The outerskirts consist of reddish gravel soil with many stones. There the Hanepoot has for the greatest part been grafted on Riparia Gloire de Montpellier and is thriving well. The majority have been planted 3 ft. square. During my visit there (in the middle of June) the grapes were still green—they do not start cutting the grapes for raisins until the 15th of August—but the vineyard looked very well. The disease *Erinose* was very bad in patches, without, however, causing any damage worth mentioning. Rather great damage was caused by *Plasmopara viticola*.

Method of Cutting.—The manner in which they cut the vines is extremely interesting. They have had the same experience as we, viz., that Hanepoot soon gets weak in the old wood and, therefore, does not become very old. Well, in order to overcome these difficulties they always cut the stick in such a way as to make as little old wood as possible. And in order to secure the early ripening of the grapes they keep the vine as near to the ground as possible. The vines—15 years old—had on an average four branches, each with one bearer of two eyes. The branches were rather short, as they always cut away the old wood above and keep the lowest shoot as bearer. The crown of each stick had been cut out or sawn and tarred. They say that is done for the sake of destructive insects. The vineyard looked very fine. *They never top here.* We in South Africa probably top our vines too much. The vines were not full and in general the bunches appeared to me to be smaller than ours. The bunches were rather thin (which seems to be an advantage here). With regard to the production of grapes we are certainly not behind Malaga.

The grapes being quite ripe they commence cutting (this is about the 15th of August) and it is about the 15th of November before all their raisins are dry. The ripe clusters are selected and placed in shallow baskets made of palmiet or rushes. They will pack only one layer in the basket, and carry it carefully to the drying ground, without bruising the grapes. In the vineyard already the *perfect and sound* bunches are selected and those are dried. *Rotten berries are cut out.* It will, of course, be understood that the vineyard is not emptied of grapes in one cutting, but that they go through it perhaps eight times. We here should follow that system too, and discontinue at once the system of cutting away anything in the form of grapes. The shallow baskets may easily be made here from "biesroei," or better still plaited from rushes.

To anyone desiring to do it I will be pleased to give the necessary details. If I am not mistaken these baskets are carried on the head.

THE DRYING GROUND.

The site for the raisin ground should be near to the vineyard in order to prevent the grapes being bruised when carried from the vineyard to the drying ground. It is necessary to emphasise at once *that the grapes should never be touched with the hand*. The bunches are taken by the stalks and the last are cut off near to the shoot for the purpose of preventing the berries losing their bloom (or bluish small layer of wax on the berries) or getting bruised by a direct touch of the hand. The drying ground is here usually a sloping piece of ground, lying directly towards the south. The ground is thus selected or prepared in such a way that the rays of the sun may fall as perpendicularly on the grapes as possible and that the grapes may dry as quickly as possible. This ground consists of many drying spaces next to each other and only separated by narrow passages. Each drying space is about 40 ft. in length and 10 ft. in width. At the upper and lower ends there are small white walls of masonry in the form of a triangle. These small walls have the same width as the drying space and the highest part of them is at the ends of the central line of the drying area. They are vertical and about 2 ft. 10 inches in height. At the highest point there is a notch in which a pole is put when the raisins have to be covered up in the evening before sunset. On both sides of the drying space there is a little wall of one brick (about 4½ inch high and 3 inches wide) of masonry. About a foot further away there is a bundle of long reeds, running also parallel to the sides of the drying space, which are kept in the ground by means of a few barbed iron pins. The pole (for the sail) is supported by three iron supports in order to be better able to carry the weight of the sail, with which the raisins are covered during the night or in bad weather. These sails should be waterproof. They are placed above the raisins about half an hour before sunset and well fastened to the reeds on both sides on the ground. Both the small walls of one brick and those at the upper and lower end seclude the drying space in such a way that the raisins are thoroughly protected against wind and weather when the sails are well fixed. As mentioned above, the sails are taken off the following morning an hour after sunrise. The drying ground is only ground which has been watered and beaten down to make it as hard as possible before the raisins are placed on it. In order to render the ground warmer the surface layer is usually mixed with charcoal or powdered black slate. But it would be better if the Spaniards would also use thin wooden trays. After 2-2½ weeks the bunches are all turned carefully, and after about 3-4 weeks the raisins are sufficiently dry to be taken up. The dry clusters are then taken to tables, where women with sharp scissors cut away all the bad berries and sort the raisins into four classes, according to colour and size of berries and clusters.

The last lot of raisins can as a rule not be finished outside, because the heat of the sun in November is too weak. These are dried in heated rooms, which are kept at a temperature of 86-90 degs. Fahr. by means of steampipes. The partly-dried raisins or grapes are packed in these rooms on shallow wooden "stellasies" with sieving wire frames. These "stellasies" are stacked above each other on wooden arms.

Note.—It may here be mentioned that grapes dry more quickly on "stellasies" which are lying on the ground than on those which are in the free air at a certain height from the ground.

A good quality Malaga raisin, which is sufficiently dry, should have a fine dark violet colour, toned down by the bloom, covering the berries; the skin should be supple but fairly tough and the flesh firm. The surface of the berries should be dry, smooth and shining, without having the slightest sign of stickiness. For those reasons it is necessary to remove all injured berries before the grapes are dried; if that is not done they will smear a syrup on the other berries and cause them to become sticky and dirty.

The raisins being sufficiently dry, they are taken up cluster after cluster and those of the best quality are placed in one layer, the other ones in two layers on "stellasies" till the time they are packed in small boxes.

In Malaga the raisins are sorted into five higher and five lower classes. In proportion to the rising of the quality finer and more expensive wrapping paper is used, and it is amazing to see how far luxury is going in this direction.

PACKING.

In Malaga the packing of Malaga raisins has really become an art. They have three sizes of boxes, viz., whole, half and quarter boxes, respectively 4, 2 and 1 inch deep by 22 inches long and 10 inches wide. They contain respectively 10, 5 and $2\frac{1}{2}$ kilograms, i.e., 22, 11 and $5\frac{1}{2}$ lbs. of raisins. The clusters being generally too small and too thin, from two to four of them are laid together and pressed flat between the hands without destroying the bloom of the berries, the retention of the bloom being considered of much value by the trade.

Anyone can understand that this kind of work can only be performed successfully by experienced and skilled hands.

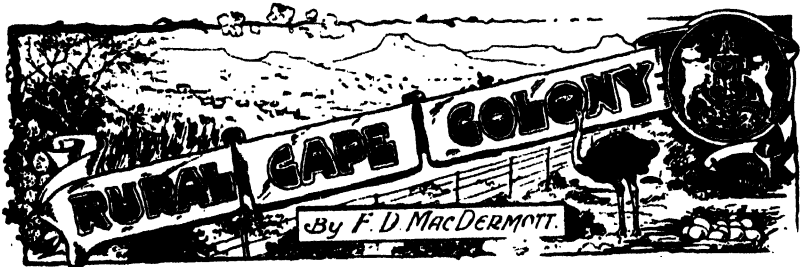
I will hold back a description of the way such a box is packed, because that is almost an impossibility without drawings and photographs. It may suffice to say that the boxes concerned contain 4, 2 and 1 layer of raisins respectively, which have all been separately packed in paper for the purpose of being taken out easily in the retail trade; and that every layer contains nine clusters, the largest of which lies in the centre, three large ones on both sides and two smaller ones at the upper and lower ends.

Beautiful, white lace-paper and beautifully-coloured papers with fine portraits are used to pack the raisins in such a way as to cause anyone opening such a box or seeing it open to get a desire to eat raisins. The better the quality of raisins, the more expensive the packing paper, etc.; so, for instance, the box itself for 22 lbs. of raisins costs in Malaga 6d. and the paper, with portraits for the better qualities, 8d. per box, while those for the inferior qualities cost only $3\frac{1}{2}$ d.

Selling Price.—The price of Malaga raisins varies, of course, but in 1905 the prices for Malagas ran from £1 5s. 7d. to £6 for 220 lbs. for those of the 10th and 1st class respectively. Therefore the best Malagas cost about 7d. per lb. and the poorer ones about $1\frac{1}{2}$ d.

I am of opinion that we can successfully produce Malaga raisins and probably we will obtain good prices for them in our own country. Recently I have seen a cluster of Malagas in Cape Town and, on my asking the price of it, the man told me without stirring a feature: *one and sixpence a pound!* Such a figure speaks for itself.

Might the hints given here help in placing the existing raisin industry on a better basis, and also help extending it in the new direction of the Malaga raisins, which, without doubt, have a good future, either for local consumption or for export purposes.



NO. XXX.

AGRICULTURAL ENTERPRISE IN THE ARID SECTIONS.

GLIMPSES AT THE WESTERN KAROO.

It is some time since the last of this series of articles on the farming problems and difficulties of this Colony appeared in these pages and, according to some of our correspondents, an impression seems to have gone abroad that they had been completed. Now, although the series has spread over so wide an area it is becoming more evident as time goes on that it is hardly possible to do more than touch on the fringe of the many interesting subjects involved, by the means, and in the time, at my disposal. I have therefore to do the best I can as opportunities arise and deal with the many differing sets of conditions as I get the chance to become acquainted with them at closer quarters.

We are all more or less familiar with the general outlines of what has come to be known in this Colony as Karoo Farming, but I very much doubt if there are many readers of the *Agricultural Journal*, or any other section of the community, who fully realise the varying and almost contradictory conditions which this term includes. Karoo Farming in the Cape Colony may be taken to be synonymous with the so-called "Dry Farming" of America—only more so. These vaunted "Dry Farmers" of the semi-arid belts of the American Continent manage to struggle along, according to their own showing, in conditions which, by the average Karoo Farmer, would be considered extravagant ease. Yet the Karoo Farmer, though the driest of "Dry" Farmers, has never yet posed before the world as the apostle of any form of New Agriculture. He has been content to do the best he can in the conditions in which he finds himself placed—whether that best be the very best which could be done is another question. No matter what may be said on this side of the question, however, there can be no two opinions as to the difficulties and

troubles which Karoo farming entails—not to mention the disappointments and heart-breaking losses which are so frequently the result of even the most careful and best-informed efforts.

It is not my intention here, however, to institute comparisons or draw deductions as to methods or plans in the handling of our South African dry lands; that can be left for other occasions. All that I desire to do is to show what our farmers are doing in very trying conditions and let their success or failure speak as to the effectiveness of these methods. It would be a very simple matter to issue an enthusiastic appeal to the farmers of the Karoo to take up the methods for which so much success is claimed in North America were it not for the palpable fact that our Karoo conditions are so patently different as to call for widely different treatment.

The Western and North-Western Karoo is considered by most people who know it to be an exceedingly interesting section of the country. The traveller by train when passing through the District of Beaufort West, for instance, can scarcely be expected to wax very enthusiastic over its prospects unless there had been a recent fall of rain. In that case the whole aspect changes. What in ordinary times would be written down as approaching very near to desert conditions, at once begins to change and take on a much more promising appearance. It is these extremes which make the Karoo so fascinating a problem, and when to this set of varying conditions is added the well-known healthy climate it is not to be wondered at that men maintain the pre-eminence of these sections even though they are undoubtedly very dry.

When gathering the notes and impressions for this article I purposely moved as fast through the country and saw as much as I could in the time at my disposal. I was thus enabled to get a glimpse at the Districts of Beaufort West, Carnarvon and Britstown, and highly interesting these glimpses were.

Beginning at Beaufort West I was enabled to leave the beaten track, and those sections which can be seen just as well from the railway, and cross over to the Nieuwveld Mountains in a North-westerly direction. Here one can get a good idea of most of the prevailing conditions, and the more one sees the more one is convinced that the day is not far distant when the men who have made their homes here are destined to win great and lasting triumphs in the face of all the natural obstacles. The lower-lying sections around Beaufort West itself, including that known as "the Gough," are not very inviting to the eye, but once the upward trail is followed and one begins to tackle the road to the mountains a great change comes over the landscape. From the gentle undulations of the lower country the road gradually rises through a series of sharp curves and grades until the crest of the Nieuwveld range is reached, some 5,000 ft. above sea level, when the country slopes gently away in the other direction.

This range forms the watershed for an immense area. It rises very abruptly from "the Gough," its sharply-defined masses standing up like the weather-beaten cliffs of an ocean coast line. From the top the views are wonderful. As far as the eye can reach, the mountain range stretches away in the distance, while the Gough and Beaufort West lie almost at one's feet, though some fifteen hundred feet or more below, like the bed of a vast lake, drained dry through the ages. In the dim far distance, the further shore of this immense basin looms up in the darkening heights of the Zwartberg range. Altogether an impressive picture. This short sketch should serve to give some idea of the topography of these parts and at the same time indicate the average nature of the



The Homestead, "Paardekraal," Mr. Paul Nel's residence.

watershed. On the one side the watercourses, fed by the summer storms, empty their flood waters towards the South-east coast. These find their rapid exit to the sea through the rapidly-falling rivers on that side of the country. On the other side of the mountains the streams move with less rapidity as the watershed does not seem so steep. Here the flow is towards the Orange River as the main channel of drainage. Take as an instance the Zak River. Most students of the general topographical conditions of the Western Karoo are aware of the great part this stream plays in the general productiveness of the North-western districts, and of the splendid results obtained by the system of flood irrigation along its valleys known as "Saai Dams." This work is done in the Fraserburg District many many miles from the Nieuwveld Mountains, and very few would be inclined to associate the Zak River with Beaufort West. Yet the Zak River has its origin right at the top of the Nieuwveld Mountains almost in sight of the town and is largely responsible for a great deal of the fertility of a goodly proportion of this part of the Beaufort West District.



Flood Diversion Weir on the Zak River at "Paardekraal."

AT MR. PAUL NEL'S FARM, "PAARDEKRAAL."

It is not often that one can step right on to a property like "Paardekraal," where Mr. Paul Nel, at one time a prominent Pretorian, has settled down to try his fortunes as a Karoo farmer. This farm, or rather series of farms, for he has included two others in the group, namely, "Grootvlei" and "Wittehart"—enables one to realise, from what has been done up to the present in the shape of development, a general idea of the probable lines upon which the general farming of such a section is most likely to successfully advance. These properties are situated at almost the highest portions of the Nieuwveld Range, but are slightly favoured above surrounding properties inasmuch as they lie in a "kom" or shallow basin formed by the gentle slope of the watershed and the erosion of the surrounding hills. This gives them several advantages, the first being that of a certain amount of shelter and the second a slight increase in the precipitation of moisture.

It has first to be remembered that the average rainfall of this section is about ten inches per annum, most of which falls in the shape of summer storms. Britstown, which I visited later on, claims about eleven and a half inches, while Carnarvon can only boast of an average of about eight inches, all being distributed in the same manner as that of Beaufort West. Unfortunately the rainfall returns for these districts are very incomplete as there are not sufficient recording stations to supply full averages. This is all the more to be regretted because the rains are frequently very local and seldom spread over a very wide area. Thus it may rain in the mountains and there may be little or none on the adjoining plains, or thunderstorms may burst in one place and travel in a circumscribed area, leaving the rest of the country as dry as the proverbial bone.



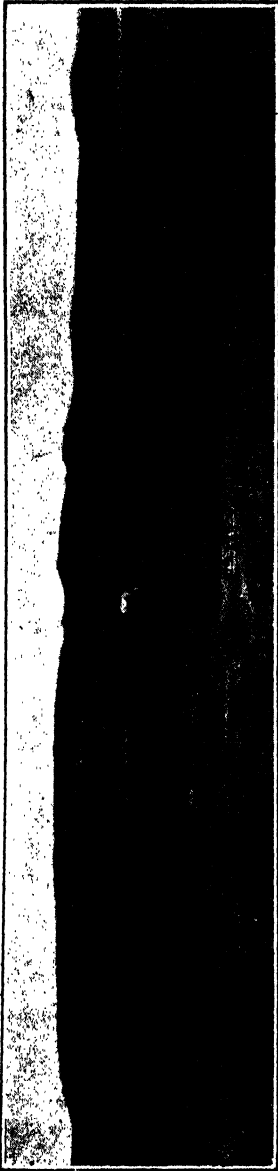
Merino Stud Ram at "Paardekraal."

It is the uncertainty of these conditions which is at the bottom of the most serious problem these parts have to contend with. The one advantage which can be generally claimed is that the soils though arid are, generally speaking, fairly fertile, while in patches they are very rich indeed. Against this, on the other hand, is the occurrence of alkali, or "brak," that bugbear of farmers in very dry countries. But this cannot be looked upon as a very serious trouble as it only crops out in patches here and there. On "Paardekraal" and the adjoining properties, for instance, the "brak" is by no means troublesome; in fact it is considered by many a distinct addition to the farm.

THE GREAT ASSET—THE NATURAL HERBAGE.

The natural vegetation of the country is the great asset. Unlike the arid sections of North America the Karoo produces in abundance the peculiarly succulent edible plants which are generally known as Karoo Bushes. Of these there are many varieties, some being excellent for stock food and others almost useless. In the dry periods, of course, the ground is

parched and everything looks shrivelled and burnt up, yet the season has to be exceedingly dry when stock food becomes really scarce. The first trouble as a rule is the lack of drinking water in the large camps which are necessary for stock in such conditions. But even this is gradually



Brood Mares and Foals in the veld at "Paard-kraal."



Stud Merinos in lucerne camp at "Paardekraal," engine house and poplar bush in the background.

being overcome by boring and the development of underground waters. After rains, however, the whole country changes its appearance. The Karoo Bushes put on a complete new dress, and take a new lease of life. They promptly produce foliage in abundance, come rapidly into seed and within a very short time are ready to face another prolonged period

of drought and starvation. In addition to this, in such sections as the Nieuwveld, natural grasses make their appearance regularly and provide a mat of vegetation running between the Karoo Bushes, and thus give still further stores of food, while it lasts, for stock. In ordinary seasons, therefore, stock of all kinds—horses, cattle, sheep and even ostriches—thrive wonderfully, the marvellous salubrity of the climate and its peculiar dryness being exceptionally favourable to the successful rearing of every kind of farm stock.



Zeekoegat at "Grootvlei," Beaufort West.

It will thus be seen that there is little in common between the so-called Dry Lands of America and those of the Karoo. In fact there are many who hold, and with excellent reasons to back their views, that any attempt to introduce on a large scale the "Dry Farming" methods which have been found to answer in some parts of America would be fraught with danger in the Karoo. The prevailing conditions, they maintain, are all against it, while the soil is of such a nature, particularly in its physical texture, that agriculture on a large scale, no matter how carefully conducted, would be foredoomed to failure with such



"Rhenosterkolk, Carnarvon. Upper view showing stone dam over borehole; lower view showing young orchards and part of homestead.

lengthened periods of complete aridity and uncertain seasons. They point to the conditions which existed when the European first came to these parts. Then the Karoo plains teemed with wild game, which roamed in their thousands over the length and breadth of these wide expanses. They admit that the stock farmer has changed things slightly for the worse, but they are fully convinced that it is only necessary to restore the physical conditions which then existed to bring the country back to its enormous stock-sustaining capacity. Therefore, that this is a natural stock country and should be worked as such. It is gratifying to learn that new disciples are constantly being added to this vitalising



The Dam with Windmill and Power Pumping House at "Rhenosterkolk," Carnarvon.

doctrine. On every side now one hears very little in the Karoo districts but discussions as to the best methods of preventing the various forms of mischief which have injured the country in the past. In the one case it may be the salving and conservation of flood water; in another the prevention of erosion by the introduction of jackal-proof fencing to allow the small stock to run night and day instead of making footpaths which so soon grow into sluits. Again, it will be the actual reclamation of the sluits and water-courses themselves which are now seen to be a prolific source of injury by hastening the run-off of the precious rains; and last, but by no means least in the order of importance, is the new school which is arising that aims at rehabilitating the Karoo by reconstituting its natural herbage.

Now each and all of these different phases of progress are represented on the properties owned by Mr. Paul Nel. Of course some of his neighbours are looking at his energetic measures with a certain degree of sceptical criticism—not all, but some. They are like those who watched the labours of the Southeys and others in the Midlands years ago; they are now doubtful; the time will come when they will be condemning themselves for not having seen the value of such efforts sooner. Starting with properties which had been conducted for years on the old methods, Mr. Nel began by seeing what could be done in the shape of progress. First he tried wire—always a good beginning; and now he has large areas carefully camped off for stock, much to the advantage of the veld and the farmer. Next he tried his hand at utilising the flood waters. To this end he has constructed an excellent stone weir across the head channels



Friesland Bull at "Rhenosterkolk," Carnarvon.

of the Zak River (shown in the photo herewith) which is calculated to throw the waters of this stream, when in flood, over a large area of his veld, instead of running away in a useless torrent, carrying the soil with it in its resistless rush.

This work opened up another possibility. On the lower farm, "Grootvlei," a magnificent vlei exists, a reminder of what the country must have been in the days gone by. This vlei fills up in flood times and, being thick with rushes, or "Matjes-goed," and excellent vlei grasses, has always been the stand-by of these properties in bad seasons. Below the vlei is an enormous "zeekoegat," or water hole, which is kept plentifully supplied by a spring rising at the end of the vlei. Realising the advantages of these conditions, Mr. Nel proceeded early to make use of the "zeekoegat," or rather the water it contains, and by installing an oil engine and pump has been able to lay down some excellent lucerne camps,

which give splendid returns. But this is not considered sufficient, and another scheme is under consideration by which the lower end of the "gat" will be closed up and a much larger supply of water impounded. By this means it is also hoped to retain the best features of the vlei while parts of it have been cleared and are used for crops. So that here we see a definitely-planned scheme by which in a very short time the work of re-construction should soon be well forward. There can be little doubt of its ultimate success, for with the flood waters of the Zak River thrown out over the veld, and thus allowed to soak in, vast improvements must follow, while the natural retention of moisture in the soil will further contribute to the life of the vlei, and the supply of water in the "zeekoegat" for irrigation purposes, as both lie right in the line of natural seepage. The photographs herewith show the lucerne paddocks and engine house in the distance, with a glimpse of a thick plantation of poplars which has grown up about the watercourse and springs. Another



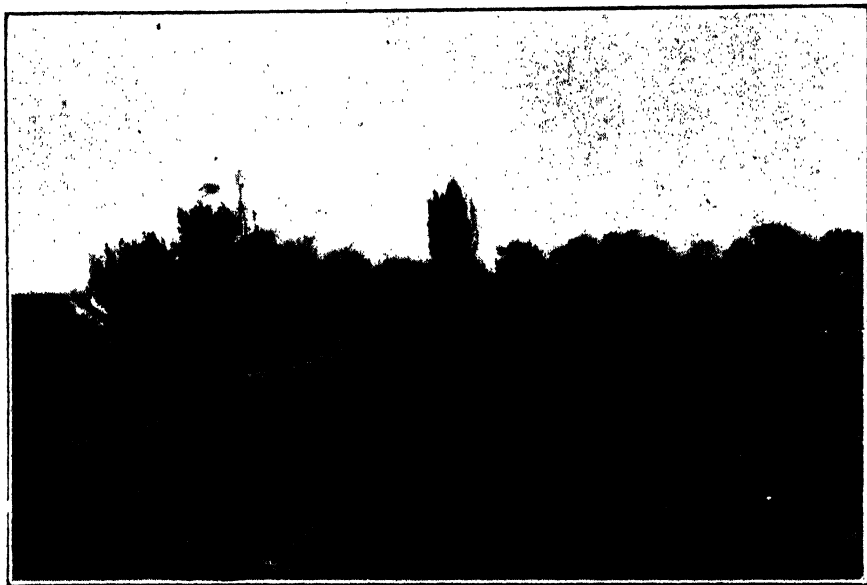
Trellised Vine, Lucerne and Fruit Trees at Schietfontein, Carnarvon.

shows the appearance of the waterhole from the lower end, all shaded over with a thick growth of poplars. The view of the homestead, too, with its tall poplars will serve to show what can be done in the barren Karoo by a little energy and forethought. The homestead is an old building and the poplars are the product of an older generation, so that there is plenty of encouragement for those who have to face the future now that the conditions are better understood.

REHABILITATION OF THE KAROO.

Several phases of the new spirit of development have been touched upon here, but the most important has been left to the last. I must now refer to the serious effort Mr. Nel is putting forth to reconstitute the natural vegetation of these farms. Seeing how well stock thrive on certain of the Karoo Bushes, and how fond they grow of them, he is

laying himself out to encourage the growth of these by every possible means. To this end he has fenced off huge areas of veld and not only left it fallow to recover itself, but has gone to the trouble of sowing large quantities of some of the best of the Karoo Bushes with the object of building up what might truthfully be described as permanent Karoo pastures. In addition to this he is also sowing large areas with saltbushes, including the indigenous "brak-bosches" of the Karoo, and thus hopes, in the course of time to have natural grazing for very large numbers of all kinds of farm stock. Once well-established he proposes to maintain it by paddocking and rotation in grazing. He sees no reason at all why some such system should not greatly increase the stock-carrying capacity of these farms and at the same time render them practically drought-proof if only due care be taken of the natural water supplies. It may be



Lucerne and Orchards, Town Gardens, Carnarvon.

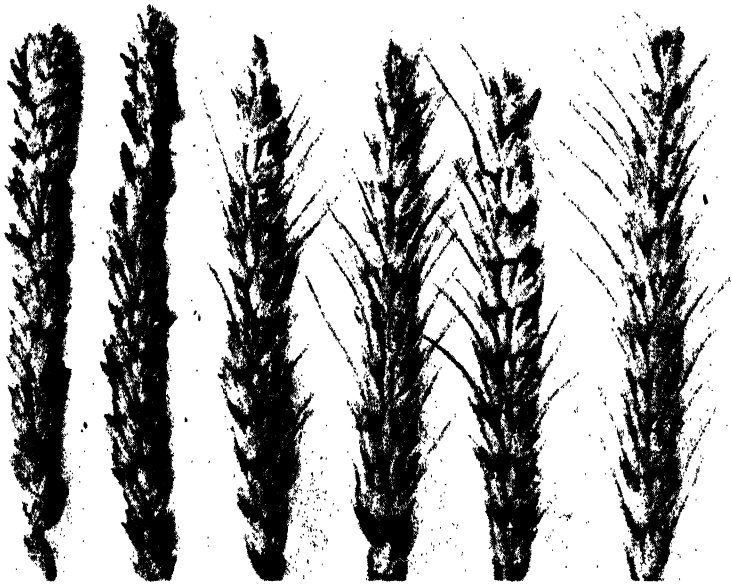
added that large numbers of sheep, cattle, ostriches, horses and mules are now carried on these farms and, in addition to the lucerne, extensive lands are laid down to wheat and barley.

LOCUST DESTRUCTION.

One of the serious troubles of this part of the country is the locust which, in times past, has done much damage. While I was there an enormous swarm moved across the country and threatened to consume every bit of green stuff on the farm. They appeared in countless myriads, and as fast as they were tackled in one place they turned up in another. Yet within a few days, I afterwards learned, the whole of them were destroyed by means of the poisoning system. It only meant a few bags of chaff and the treacle and arsenic solution, and they disappeared almost as rapidly as they came. Unfortunately they were not attacked early enough and managed to do some damage, but considering what they might have done, these properties escaped very lightly.

A GLANCE AT CARNARVON.

Time being limited, the weather being exceedingly hot and dry, and other engagements pressing, I had not the opportunity of doing more than take a short glance at the District of Carnarvon. In travelling from Hutchinson through the Victoria West District by rail the general appearance of the country prepares one very fully for what is to be seen when Carnarvon is reached. The one dominant note is undoubtedly aridity. A country of continuous drought is the impression it gives the new comer. Yet a wonderful country for all that, for on every hand there are indications of prosperity and large herds of small stock are seen spread over the veld. This, of course, is in normal times. In the really bad times when the drinking waters give out and the farmer has to trek for many weary miles in order to save the remnant of his stock, the view darkens and the hard monotony of the Karoo farmers' lot becomes



Ears of wheat grown at Zaaipoort, Carnarvon, after floods of April, 1909, reduced by one-third.

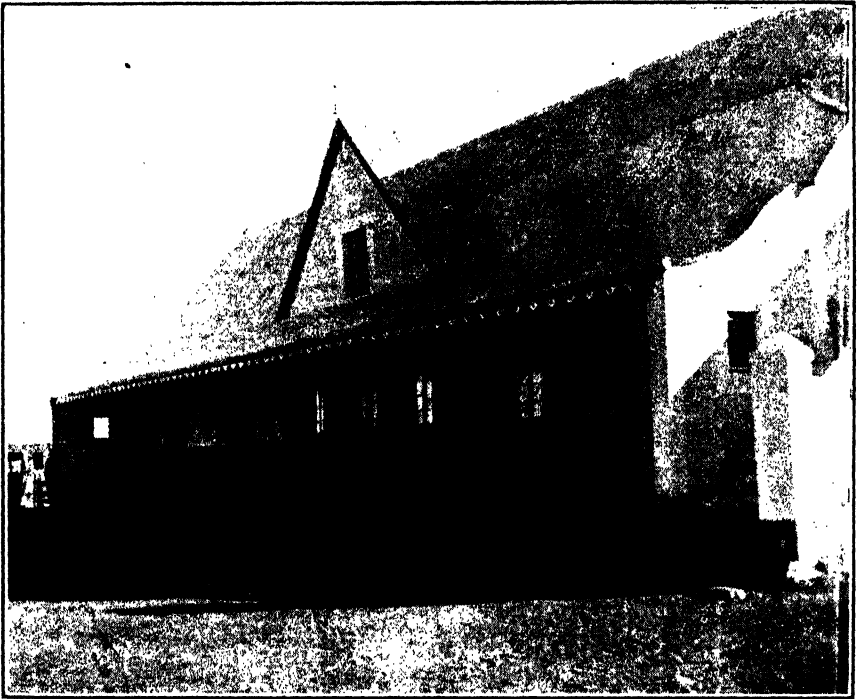
particularly accentuated. But there is still another phase. There are times when the long-looked-for rains come pelting down, when the streams run in lashing floods, when the dams fill to the bursting point and the wells and underground stores are soaked to repletion. It is these periods which rejoice the inhabitant of the North-western Karoo and fill his heart with sufficient gladness to face another lengthy period of drought and again patiently wait for the seldom recurring rains. In face of these decidedly discouraging experiences there is still plenty of hope in the North-west. And what is more to the point this hope is being translated into commercial terms, which spell development on sound and solid lines. There is so much to be done in a District like Carnarvon and so many discouraging obstacles to overcome, that it would be difficult for anyone to say off-hand where a beginning could best be made. Like so many more of our backward sections, however, I am strongly of the opinion that

beginnings will be made in several directions at once. Whatever else is done the development of water for stock-drinking purposes and, wherever possible, for irrigation on a small scale seems to be the paramount need. This is now being done. Of course it is proceeding slowly, as such things should in the experimental stages. It would be impossible for it to do otherwise. First the natural spring or small stream is developed to its utmost capacity, then follows the conservation dam to catch and conserve flood waters. Next will come the drilling machine and the aer-motor to lift the water from the underground supplies tapped by the bore. And development has advanced still further yet, for deep holes have been sunk, large supplies of very good water tapped and power pumps are merrily running to bring these hard won waters to the surface for irrigation purposes.

The general contour of the country is different to that of the surrounding districts inasmuch as it seems to trend by gradual declination in the shape of exceedingly wide leegtes or shallow valleys right across to Van Wyk's Vlei and the Orange River. At no point is there any serious break in the watershed. When rains fall they spread over the land in an almost even flow and so gradually pass over the surface and soak into the rather deep soil of the hollows. As these leegtes seem to be fairly frequently traversed by igneous dykes the water-seeker has not great difficulty, as a rule, in locating a likely spot. These dykes seem to have served another very valuable purpose also in the past, for they have apparently been the means of catching and holding very deep deposits of alluvial silt, which now form the beds of the leegtes or shallow valleys mentioned above. It is only in the rivers that one notices really serious wash-outs, and that is in places where the dykes have either never intruded, or lie at such depths as to have little influence on the surface conformation. These conditions point very distinctly to at least one probably successful method for developing these large tracts of bare veld.

The town and townlands of Carnarvon itself may be taken as a case in point. Naturally the town has developed on a site where water is fairly easily obtained. But where does the water come from. It is only necessary to turn a little way back along the valley through which the rail travels to see it. The flood waters evidently debouch on the farm Beyersberg, and from there flow down towards Blaauwkrantz, the farm belonging to Mr. Visser, the sitting member for the division, and now worked by his sons. Here at Blaauwkrantz they have practically a permanent water, thoroughly well conserved, though the ordinary stream divides and then passes on towards the town commonage. From Blaauwkrantz the river may be said to begin, but to actually say where it ends is a bit of a puzzle. All one can see is that, as it passes through the townlands it gives an opportunity at a place known as Schietfontein, a little way below the town, for an excellent bit of irrigation farming. Unfortunately these lands are municipal property and are put up to lease at regular intervals, being knocked down to the highest bidder. The result of such a system is evident in many parts of these gardens. Here also the inevitable windmill and borehole is to be seen in full use, water being found quite close to the surface. The same remarks apply to what are known as the town gardens, which are quite close to the town and are watered from boreholes by means of windpumps. The water in the stream at Schietfontein would seem to be the result of a dyke in the bed of the stream. It is this same dyke probably which has enabled the town supplies to be maintained so well. The whole of this is raised from comparatively shallow boreholes by means of windpumps, and these holes have never been known to empty. So much for this part of the country. The most interesting is lower down the watershed.

After leaving Carnarvon the gradual declination of the land is more remarkable and this carries with it an enormous catchment until a spot known as "Zaai-poort" is reached. Here the whole flow concentrates in times of floods and passes through this poort again spreading out until it covers a very wide area. At this spot, also on the town lands, large quantities of cereals are grown on the saai-dam principle. Herewith is a photograph of some wheat taken haphazard from a bundle just reaped there. This ripened in November, the seed having been sown the previous April. The remarkable part of the story is that no rain at all fell after that of April last until the wheat was reaped. Some of the grain was a little wilted and shrunken, but taken all in all it was by no means a bad crop—that is the part I saw.

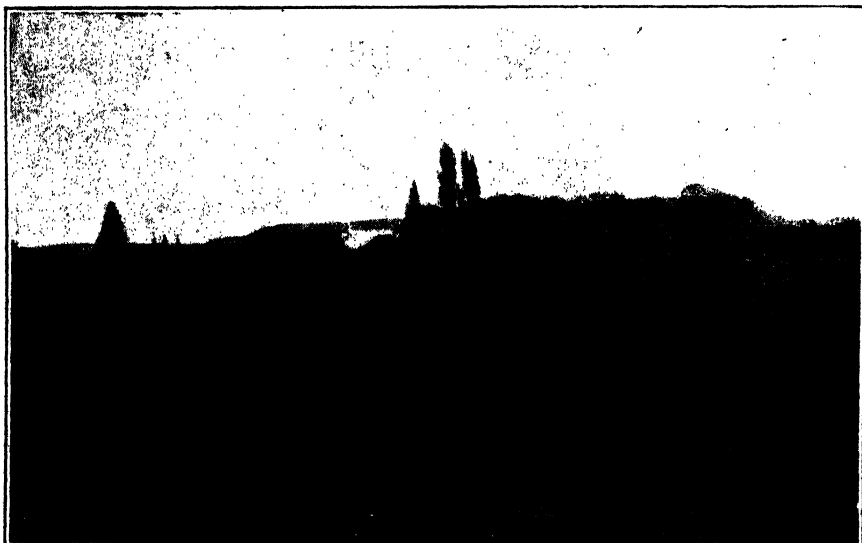


The Homestead at B'saauwkrantz, Carnarvon.

From Zaaipoort the flood waters again spread across the country in a very wide leegte until they reach Rhenosterkolk, a very interesting spot, of which more later. At Rhenosterkolk it narrows into the form of a river, and attempts are here being made to utilise this for flooding purposes. The flood waters of the country thus spread out and narrow in according to the general contour, which really continues like this almost down to Van Wyk's Vlei, I was told. It all seems a gigantic reminder of what the conditions must have been in the past. Here is the stream carrying the floodwaters of an enormous stretch of country. The greater portion of it must have been vlei and marsh, yet to-day it is all dry land except in times of flood, when the original conditions are restored for just long enough to realise what has been lost. But as it indicates what has been, it just as surely points the way to what may be done by way of reconstitution.

AT RHENOSTERKOLK.

I had the opportunity, thanks to the kindness of Mr. C. van Zyl, the owner, of visiting a developing property where efforts are being put forward to reconstitute in some measure the productive capacity of these undoubtedly rich soils. Rhenosterkolk is situated on the Carnarvon townlands. I must first explain that these townlands cover an enormous area and are supposed to be devoted to the grazing of stock belonging to the town dwellers. Not that every townsman has this right. So far as I could learn it is only those who, by purchase or inheritance, hold any of the original erven titles who can exercise this privilege. The reason of this is, I understand, because the original grants were for native mission purposes. However, the whole scheme does not appear to bring very great results. But incidentally it allows of a certain amount of development as it permits the holder of grazing rights to lay out a certain proportion of these lands for agricultural purposes and thus induces



Lucerne Camp and Orchards at Blaauwkrantz, Carnarvon

a search for permanent waters. "Rhenosterkolk" is one of these little schemes or "Opstellen," as they are called. The owner, Mr. Van Zyl, went to great expense in developing a really fine supply of underground water after boring several hundred feet. This has enabled him to lay out orchards, vineyards and agricultural lands as shown in the photographs herewith. The pumps are worked by wind and oil motors, the latter being of twelve horse power, throwing a fine stream when running. The water is very clear and free of mineral salts of a harmful nature, coming to the surface at a fairly low temperature. It is thrown into a stone-built dam, as shown in the photographs, and from there distributed over the gardens and lands. Wheat and other cereals are raised in goodly quantities and lucerne is being laid down in several paddocks. Mr. Van Zyl's intention is to spread this crop as far as possible, and it should certainly pay better than cereals once it can be successfully established. Dairying is carried on with a fair amount of success, but the great heat which sometimes occurs in the summer months is difficult to contend with.

Though stone fruits are planted, the most promising so far seem to be the apples and pears. These should also be easier to market in the conditions which prevail, and will undoubtedly form the staple crop later on in the orchards. The soils hereabouts are very deep and also seem very fertile. I went down the well in which the pumps for the borehole are placed, and at sixty-two feet from the surface the cuttings showed no sign of rock; it was all a rich, red-looking alluvial soil well supplied with lime. There should be some grand reserves of plant food to draw upon here if crops like lucerne can be successfully established.

So much for the cultivated side of this section and the attempts at development. The natural veld is also very good, the one really pitiable feature being the terrible rate at which useless and positively injurious bushes are being allowed to over-run the country. On every side this can be seen and it calls for early and prompt attention if the evil is ever to be successfully suppressed. People living in a country like this should remember what has happened in some of the Midland Districts with regard to Prickly Pear, and see what is happening in parts of the country over-run with Bitter Karoo. At first Prickly Pear was undoubtedly a helpful stand-by in times of drought. From that it has become a positive pest, all through neglect. These alkali bushes which are filling up the Carnarvon Commonage and other parts of the District to the exclusion of the natural edible, drought-resisting plants, so valuable in a dry country like this, are of no use to man or beast. They only cumber the ground and should be swept away at any cost before they grow too numerous to tackle. The natural veld is splendid for small stock particularly, and can with a little auxiliary feed like lucerne or oats and bran be made an excellent ration even for large stock. It should, therefore, be conserved and reconstituted wherever such efforts are possible. There is a still more serious side to this question. This natural herbage is the whole wealth of the Carnarvon District. Once this is lost such a country must sink into semi-desert conditions. It does not call for a great stretch of imagination to realise the end of the constant grazing down of the good veld and its replacement by useless alkaline scrub. It may be argued that the natural conditions will prevent complete ruin, because when things get very bad the veld will have to be rested as it will not carry the stock any more. In such a case some think reconstitution will take place as a natural result. To this the reply is obvious. When veld is exhausted it takes an enormous length of time to recover, and it is doubtful if it ever returns to its original condition. This can all be avoided by a little care and forethought now. The question that arises is who is going to preach the new gospel and lead the movement by practicing his own precepts? That there is much valuable work to be done in this direction is amply evidenced by the returns the careful farmer gets from his efforts. If those efforts can be improved, even though he may not further increase his immediate returns, he will at least assure himself against future loss. Surely it is worth sinking a little energy and money into so simple a form of insurance.

RAMBOUILLET AND THE RAMBOUILLET MERINO SHEEP.

(Contributed).

Of the several breeds of Merino sheep which from time to time have been imported into South Africa, the one which can claim the oldest standing is undoubtedly the Rambouillet breed of Spanish origin, which under the care of "Daubenton," the great French naturalist, was herded at Rambouillet, in the district of Seine and Oise, some 123 years ago, and known successively as the "Royal Sheep Fold," "the National Stud Flock," the "National Stud Farm," etc., etc.

"Rambouillet" is thus a regional name of France, and should only be applied when denominating the sheep of the Merino breed which are bred in its district out of pure-bred sires and dams of the "national stud flock."

There is, we believe, at the present time in France a movement on foot to protect the name of "Rambouillet," which, when the French Government will have studied the claims of the French Merinos breeders, will limit that denomination exclusively to sheep which have been bred from thoroughbred sires and dams of the pure Rambouillet strain.

South Africa has at various periods imported "Rambouillet" pure-bred Merinos. We know that as far back as 1810 some were introduced in the district of Bredasdorp, and gave excellent results, their progeny being a hardy, robust, prolific sheep, endowed with a great acclimatising power and possessing heavy clips of fine wool. Unfortunately the importation of that pure strain was not kept up.

Later on attempts were again made to introduce pure-bred Rambouillet Merino sheep into the Cape Colony, but like on former occasions the want of perseverance compromised the success of the undertaking. Meanwhile other Merinos breeds, such as the Australian, New Zealand, American, and German breeds, found their way to South Africa, but with more or less good results.

Some six years ago, however, another attempt was again tried by well-known Cape Colonists in introducing the pure-bred Rambouillet Merinos in the district of Bedford, and this time with a determination to prove that the qualities of the Rambouillet strain, were not a mere fiction but a reality.

Messrs. Pringle Bros., of Glenthorn, the Bedford breeders, were inspired by the real advantages that the French breed was offering to persevering breeders, for they realise the certainty that the breed had an acclimatising power and a stamina which would make it desirable for South Africa, and give that country a most useful and therefore profitable sheep. From 1903, the sires imported by the breeders of "Glenthorn"

were both on the sire and dam sides, crack stud rams who much improved the flock and allowed the breeders to breed up to the original type, thus correcting many adverse tendencies.

So much were they satisfied with the results of their enterprise in which perseverance had not the smallest part, that at the beginning of the present year they had a new sire imported from Rambouillet. Stud Ram 654 is a sire of very great promise. He is noted for his constitution and for his wool. He is an upstanding, proud-looking, short-legged, long-barrelled, dense-backed, and long-stapled ram, capable of improving any flock of ewes, in the constitution and in the clip. The sire and grand sire as well as the dam and grand dam of 654 were all noted as symmetrical and heavy wool-bearers, and as "like breeds like" 654 has inherited qualities and points which he cannot fail to transmit to his progeny. Encouraged by the superior strain which they had secured from Rambouillet, the enterprising proprietors of "Glenthorn" made another importation, and after long *pourparlers* they were fortunate in securing the crack stud ram 724, who like his mate 654, has had a very brilliant stud career. 724 was born on the Government National Stud Farm Rambouillet in 1905, his sire being 504 (bought by General Louis Botha for his farm at Standerton) and his dam 1231, his grand sire 319, his great grand sire 91. On the mother side, the grand dam was 860 and the great grand dam 394. Stud Ram 724, belonging to the 120th Generation, according to the entry in the Official Stud Book, it would be a very easy matter to trace that ram's pedigree as far back as the very origin of the Rambouillet Flock—a guarantee which no breeder, even those who are fortunate to sell their sires at fabulous prices can offer.

Suffice it for us to say that all the sires, grand sires, or great grand sires and all the dams of that crack stud ram, were very faithful representatives of the Rambouillet Merino breed, and all possessed to the very highest degree, both the stamina and the wool-bearing capacity which has made the Rambouillet breed so popular at Home and abroad, and especially suitable for such a capricious climate as that of South Africa.

Both Stud Rams 654 and 724 have left a capital stud record at the Rambouillet National Farm, 724 especially being noted as a long stapled sire, will do much to improve the fleeces of the Bedford flocks which are already noted for the evenness and homogeneity of their covering and also for their massive frames, thus coming every day nearer and nearer to the original Rambouillet which is so thoroughly represented by the recent importations of Messrs. Pringle Brothers.

Long ago it was predicted that the French Rambouillet Merino will yet become the breed of the future in South Africa. Let our sheep-breeders be wiser than their fellow-breeders of the Argentine who have greatly compromised their wool production which had so much contributed to the wealth of that country, by substituting for the French Merino breed other breeds which were responsible for the production of poor frames and poor clips of wool, so much so that the Argentine is noted for its cross-breeds, but no more for its high-grade wool. The disappearance of the pure-bred Rambouillet from the flocks has caused that prejudicial condition.

SEEDS FOR EXPERIMENT.

FREE DISTRIBUTION OF AGRICULTURAL SEEDS OTHER THAN CEREALS FOR THE COMING SOWING SEASON.

The Department of Agriculture is prepared to distribute a limited quantity of the undermentioned seeds free of charge to *bona fide* farmers in the Colony, for the coming sowing season. These seeds are intended solely for purposes of experiment, and in applying for same the following conditions must be borne in mind:—

(1) Each recipient of seed undertakes faithfully to furnish this Department with a report showing the result of the experiment on a form which will be provided for the purpose. In the past when an experiment has failed, farmers have been under the impression that a report was unnecessary. This, however, is quite a mistaken idea, for the negative report, from an experimental point of view, is just as valuable as the successful one. It is therefore imperative that, no matter what the result, a report must be furnished this Department on the report forms provided for this purpose.

(2) Not more than five varieties will be supplied to any one applicant, but should it happen that the varieties applied for exceed in cost a certain amount to be arranged by the Department, the number of varieties forwarded will be reduced, at the discretion of the Department, so that the cost of same is within the fixed limit. This has been found necessary on account of the lack of funds, but it is only in a few cases where the cost of the seed applied for is very high that it is likely this course will be resorted to. It frequently happens, also, that the stock of a particular variety comes exhausted or is not available owing to various reasons, in which case such variety will be deleted from the application form, or will be substituted by some other variety at the discretion of the Department.

(3) As it is felt that many farmers will require seed for special reasons such as (a) a grass considered suitable for sowing in vleis, (b) for winter feeding, for ostriches, sheep, cattle, etc., or the opposite, viz., summer feeding, and for various other special purposes, it is agreed that if farmers apply for seed, giving the special conditions under which they expect the plants to grow and for what classes of stock and at what season of the year they desire to have a crop for the special purpose in view, and do not name any particular varieties, the officer in charge of this work will recommend and send what seed he considers will do best under the circumstances from past experience gained both in this and other countries. It must, however, be understood that the matter will be still purely experimental for many reasons, and that the officer advising is doing so from his knowledge of the plant in question, its habits and the peculiar conditions under which it has flourished and the purpose for which it has been used in this and other countries. Directions are herewith published for the sowing of the various seeds offered. These directions are subject to alteration from time to time as

more experience is gained, which must necessarily follow owing to the great variation in climatic conditions and soil all over the Colony. At the same time this publication will obviate the necessity of sending directions for sowing to each individual applicant.

(4) Applications will be received up to and including the 31st March, 1910, for which the form forwarded herewith *must* be used. Applications received after this date will not be entertained.

LIST OF AGRICULTURAL SEEDS FOR DISTRIBUTION, SOWING SEASON, 1910, SHEWING QUANTITY OF EACH VARIETY AVAILABLE FOR ANY ONE APPLICANT.

GRASSES :

Italian Rye Grass (<i>Lolium multiflorum</i> Lam. [<i>L. italicum</i> A. Br.])	... 5 lbs.
Perennial Rye Grass (<i>Lolium perenne</i> L.)	... 2 "
Devon Evergreen Rye Grass	... 2 "
Cocksfoot (<i>Dactylis glomerata</i> L.)	... 2 "
Tall Fescue (<i>Festuca elatior</i> , sub. sp. <i>Arundinacea</i> Syme)	... 2 "
<i>Paspalum dilatatum</i> Poir	... 2 "
Natal Red Top Grass (<i>Tricholena rosea</i> Nees)	... 4 oz.
Rescue Grass (<i>Bromus unioloides</i> H.B.K.)	... 2 lbs.
Red Fescue (<i>Festuca rubra</i> L.)	... 2 "
Sheeps Fescue (<i>Festuca ovina</i> L.)	... 2 "
<i>Phalaris bulbosa</i> L.	... 1 oz.
Perennialised Italian Rye Grass	... 2 lbs.
Teff Grass (<i>Eragrostis abyssinica</i> Link.)	... 1 lb.
Guinea Grass (<i>Panicum maximum</i> Jacq.)	... 4 oz.
Rapoko (<i>Eleusine Coracana</i> Gaertn.)	... 3 lbs.
Blaauwzaad (<i>Eragrostis curvula</i> Nees)	... 100 plants
Meadow Fescue (<i>Festuca pratensis</i>)	1 lb.

ROOT CROPS.

Mangolds (*Beta vulgaris* L.) :

Long Red	... 1 lb.
Yellow Globe	... 1 "
Golden Tankard	... 1 "
Orange Globe	... 1 "
Giant Half Sugar White	... 1 "

Sugar Beet (*Beta vulgaris* L.) :

Vilmorins Improved	... 1 lb.
German	... 2 lbs.

Turnips (*Brassica* Sp.) :

Early Six Weeks	... 8 oz.
Snowball	... 8 "
White American Strap Leaf	... 8 "
White Stone	... 8 "
Purple Top Mammoth	... 1 lb.

Carrots (*Daucus carota* L.) :

White Belgian Cattle	... 8 oz.
Yellow Belgian	... 1 lb.
Long Red Surrey	... 1 "

Swedes (*Brassica rutabaga* L.) :

Webb's Imperial	... 8 oz.
Giant	... 8 "
Monarch	... 8 "

LEGUMINOSAE.

Beans :

Scotch Horse (<i>Vicia faba</i> L. var.)	2 lbs.
Tick (<i>Vicia faba</i> L. var.)	... 2 "
Honey Locust Bean (<i>Gleditsia triacanthus</i>)	... 1 lb.

Vetches :

Spring (<i>Vicia sativa</i> L.)	... 4 lbs.
Sand or Hairy (<i>Vicia villosa</i> Roth.)	... 4 "
Kidney or Yellow Sand Clover (<i>Anthyllus vulneraria</i> L.)	... 8 oz.

Clover (*Trifolium* Sp.) :

Broad Red (<i>Trifolium pratense</i> L.)	... 3 lbs.
Giant Cow Grass (<i>Trifolium pratense perenne</i>)	... 3 "
Dwarf White (<i>Trifolium repens</i> , L.)	... 3 "
Giant White (<i>Trifolium repens</i> L.)	... 3 "
Alsyke (<i>Trifolium hybridum</i> L.)	3 "
Alexandrian (<i>Trifolium alexandrinum</i> L.)	... 3 "
Crimson (<i>Trifolium incarnatum</i> L.)	... 3 "

Lucerne (*Medicago sativa* L.) :

Turkestan	... 2 lbs.
<i>Medicago arborea</i> L.	... 1 lb.
<i>Medicago media</i> Pers.	... 2 lbs.

Tagasaste (*Cytisus proliferus* L.) ... 1 lb.

Sainfoin (*Onobrychis sativa* Lam.) :

Giant Milled	... 1 lb.
Common	... 1 "

Sulla, Spanish (<i>Hedysarum coronarium</i> L.) 2 lbs.	RAPE :	
Serradella (<i>Ornithopus sativus</i> Brot.) 1 lb.	Dwarf Essex 3 lbs.	
Lupins :	Summer 3 "	
White (<i>Lupinus albus</i> L.) ... 2 lbs.	Winter 3 "	
Blue (<i>Lupinus angustifolius</i> L.) 2 "	Kangaroo 2 "	
Cowpeas (<i>Vigna catjang</i> Walp.) :	FLAX RIGA 2 lbs.	
Zwartbekje, Recumbent 2 lbs.	KALE :	
*New Era, " 2 "	1000-headed 1 lb.	
*Calico, " 1 lb.	Hardy Branching... .. 1 "	
*Coffee, Erect 2 lbs.	CHOU MOELLIER 1 oz.	
*Whip-poor-will, Erect 1 lb.	CANSTOR OIL, Red Stalked 1 lb.	
Melilot : Yellow Flowered (<i>Melilotus officinalis</i> Lam.) 1 lb.	SUNFLOWER, Tall Russian 2 lbs.	
SORGHUMS :	CHICORY :	
Planters Friend 2 lbs.	Short Brunswick 8 oz.	
Early Amber Cane 2 "	Magdeburg... .. 8 "	
Imphee (Saccharatum) 2 "	HELIANTI (As available)	
Long Brush Evergreen Broom	SALTBUH :	
Corn 2 "	<i>Atriplex semibacatum</i> B. Br. ... 1 lb.	
MILLETS :	" <i>nummularia</i> Lindl. ... 4 oz.	
Japanese (<i>Panicum crus-galli</i> L.) 2 lbs.	" <i>vesicaria</i> Heward. ... 4 "	
Pearl (<i>Pennisetum typhoides</i> Rich.) } 2 "	" <i>campanulata</i> Benth. ... 4 "	
Nyouti (<i>deum</i> Rich.) } 3 "	" <i>leptocarpa</i> F.W.M. ... 4 "	
Boer Manna (<i>Setaria italica</i>) 3 "	" <i>Nuttallii</i> S. Wats. ... 4 "	
Hungarian (<i>Beauv.</i>) 2 "	" <i>canescens</i> James. (Shad Scale) 4 "	
Teosinte (<i>Euchlana Mexicana</i> Schrad.) 8 oz.	<i>Atriplex pabularis</i> A. Nelson (Nelson's) 4 "	
Sacaline (<i>Polygonum sachalinense</i> F. Schmidt) ½ oz.	Cape 4 "	
	BURNET, Sheep's (<i>Poterum sanguisorba</i> L.) 1 lb.	
	DRAAIBOSCH (<i>Aster filifolius</i> Vent. [<i>Diplopappus filifolius</i> D.C.]) 1 oz.	
	KARROO BUSH (<i>Pentzia virgata</i> Less.) 2 lbs.	

* These varieties are difficult to obtain, and it is not certain whether they will be received in time for this distribution.

NOTE.—Maize, Cotton, Tobacco, etc., varieties will be included in the list of seeds to be distributed for the spring sowing season.

Number.....

Application for Certain Agricultural Seeds, other than Cereals, in terms of
the conditions set forth in the *Agricultural Journal*
for February, 1910.

Name

Address

Name of District.....

Name of nearest Railway Station from which delivery of the Seed will
be taken by applicant.....

Varieties of seeds required, viz.:—

1.....

2.....

3.....

4.....

5.....

The Government Agriculturist,
Parliament Street, Cape Town.

I beg to apply for the seeds enumerated above and promise to furnish
you with a report on the result of my experiment with them, whether
successful or otherwise, in due course, on the Forms provided for the
purpose.

(Signature).....

Date.....

(Applicants are requested to write distinctly.)

(Enquiries or observations must be endorsed on the back hereof.)

*
SPECIMEN REPORT FORM.

REPORT.

Name of Seed
 Quantity sent
 Dimensions of land on which sown.....
 Nature of Soil.....
 Treatment of land prior to sowing.....
 Date when sown.....
 On irrigated or unirrigated land.....
 Sown broadcast or in drills.....
 Thickly or thinly sown.....
 Late or early for the district.....
 Treatment of land after sowing.....

 When reaped
 Yield in pounds.....
 Weather generally during growth.....

 If attacked by any insect or disease, at what date or stage of growth.
 If possible send description and specimen of such insect or diseased
 growth

 State of weather when such insect or disease was first noticed.

 Manures applied if any, and in what quantities.....

 Is the crop considered suitable for the district?.....
 Do you consider it will pay, judging by your own experience?.....

 Any general remarks that you may care to offer.....

Signed by.....

Date..... 19.

TABLE OF REFERENCE FOR CROPS.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
GRASSES.						lbs.	
Italian Rye (<i>Lolium multi-</i> <i>florum Lam.</i> [<i>L. italicum</i> <i>A. Jkr.</i>]).	...	Broadcast	...	Winter. annual or perennial.	February to May.	18—30	Should be sown in damp hollows and vleis in the West. One of the best grasses for sheep, cattle and horses. Suitable for hay making. withstands a great amount of cold. Comes to maturity rapidly in early spring and gives feeding throughout the winter. Requires a fair amount of moisture, either rainfall, irrigation, or flood water. It may be termed a biennial on account of self-seeding (if left).
Perennial Rye and Devon Evergreen Rye (<i>Lolium</i> <i>perenn L.</i>).	...	Broadcast	...	Winter perennial.	February to May.	20—30	Not so particular as to soil as Italian Rye, but most suited to damp clay soils. Two of the finest grasses for hay. Suited for cattle, horses, and sheep, giving a good winter feed. Requires quite as much moisture as Italian Rye.
Tall Oat (<i>Arr-</i> <i>henatherum</i> <i>avenacum</i>).	...	Broadcast	...	Winter peren- nial only under very favourable conditions.	January to May.	14—20	Soil most suited to this variety should be one of light character. Suitable for grazing for stock and also for hay making. Withstands a fair amount of frost and cold.
Cocksfoot (<i>Dactylis</i> <i>glomerata L.</i>)	...	Broadcast	...	Winter and summer perennial.	February to May & Sep- tember to November.	10—15	Should be sown in moist districts or with a rainfall of 20' upwards. If rainfall is scarce, should be irrigated. Soils best suited are alluvial or rich clays, but also does well on hillsides of poorer nature. Makes an excellent pasture grass for sheep if not fed too freely the first year. Is better suited to mixed pastures. Very good hay can be made from it. For the purpose of hay it should be cut young, just when flowering. Stands severe cold and has done very well in some of the coldest districts of the Colony.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
GRASSES— <i>contd.</i>						lbs.	
Tall Fescue (<i>Festuca elatior</i> L. sub. sp. <i>Arundinacea</i> Syme).	...	Broadcast	...	Winter perennial.	February to May.	12—15	Rejoices in moist soil, preferably vlei ground, but is quite as good a drought resistant as lucerne, if not more so. Is a fast grower and yields good hay if cut when coming into flower. Suitable for all classes of stock for grazing. One of the finest winter grasses yet introduced. Remains green throughout the year and withstands cold and frost in a marked degree.
Paspalum dilatatum Poir	...	Broadcast	Summer perennial.	...	September to March.	10—12	Although frost cuts it down in winter it comes on again in the spring with first rains. Prefers moist, rich soils, although it grows in soils of all descriptions. A splendid grass for grazing for all stock; the more it is fed the quicker it stools out. Makes a splendid hay if cut when flowering. Ostriches take to it well. Can be sown in seed-bed and planted out 2 feet apart all ways. Spreads very rapidly under favourable circumstances, <i>i.e.</i> most seasons. One of the most popular grasses ever introduced into the Colony—for the South, West and East Coast Districts.
Natal Red Top (<i>Trichlorana</i> <i>rupestris</i> Nees).	...	Broadcast	Summer perennial.	...	August to October.	10—15	Produces a dense mass of succulent foliage in spring, which remains until cut down by frost. Withstands drought and can be grown on poor soil. Strong grower, attaining height of 3 feet 6 inches, and should be cut for hay when in flower. Suitable for all stock when young and especially suited as a green food for poultry. Owing to its beautiful appearance when in flower it is often grown as an ornamental grass.
Bushman Grass.	...	Broadcast	Summer ...	...	Spring and Summer.	...	Drought resistant.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
GRASSES-continued.							
Rescue Grass (<i>Bromus wioloides</i> H.B.K.).	...	Broadcast	...	Winter annual.	January to May or August.	20—25 lbs.	The hardiest winter grass known in the Colony, standing heavy frosts. Requires moisture to a certain extent, and a fertile soil to give good results. Seeds in September or October and quickly dies off. It is to be found in most of the gardens all over the Colony.
Meadow Rice (<i>Poa sum- perirens</i>).	...	Broadcast	...	Winter	March to May.	15—20	A very rich grass, creeping in habit. Stands frost well. Requires a certain amount of moisture. Is more suitable to grazing than for hay. Not particular as to quality of soil.
Meadow Grass (<i>Poa pra- tensis</i>).	...	Broadcast	...	Winter	March to May.	15—20	Similar in most respects to the above.
Red Fescue (<i>Festuca rubra</i> L.).	...	...	...	...	...	...	Not sufficient data to enable the drawing up of directions at present.
Sheeps Fescue (<i>Festuca ovina</i> L.).	...	...	...	...	...	...	Not sufficient data to enable the drawing up of directions at present.
Phalaris bulbosa L.	...	...	...	Winter	January to May or August to October.	...	This grass has only recently been introduced and has withstood 12° frost. It stools well, preferring rich soil, but grows on poor soil and matures in early spring. Very suitable for hay making or green food for cattle. Only small quantities will be distributed owing to the high price of seed at present, but with a little care and attention one season will produce enough seed and plants to allow of extensive experiments. Seed beds should be kept moist and after the seedlings are up the grass can be treated like paspalum. See <i>Agricultural Journal</i> , January, 1909.)

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
GRASSES—contd.						lbs.	
Perennialised Italian Rye Grass.	...	Broadcast	...	Winter perennial.	February to May.	15—20	New hybrid being introduced for first time this season. Same as Italian Rye Grass.
Tall Grass (<i>Eragrostis ciliaris</i> Link).	Drilled	Broadcast	...	...	March, April, August and September.	Thickly	As this is the first season this grass has been tried in the Colony the quantity per acre will have to be determined by experience and also the quality of soil required. It is used in its native country as a cereal, the grain producing flour of extreme whiteness, but its use in the Colony will be as a fodder plant. It makes excellent hay and is suitable for horses and cattle. It prefers light soils and does very well on sand. It matures quickly in three to four months.
Guinea Grass (<i>Pennisetum polystachyon</i> Jacq.).	...	Broadcast	...	Perennial	...	...	Requires a long season and is susceptible to frost. Requires warm weather to ripen seed. Should be cut frequently prevent it becoming too coarse. Grows to 6 or 8 feet.
Rapoko (<i>Eleusine Coracana</i> Gaertn.).	...	Broadcast	...	Annual	...	...	Annual. Very nutritious. Rapid grower. Well liked by stock. Does well in high altitude.
Blauwmaad (<i>Eragrostis curvula</i> Nees).	...	Broadcast	...	Perennial	Spring	10	Strong growing drought resistant grass. Grows well almost anywhere. Prefers damp well worked soil.
Meadow Fescue (<i>Festuca pratensis</i>).	...	...	...	Winter perennial.	...	...	Grows well in almost any situation. Seeds germinate readily. Makes good hay, much relished by stock.

Variety of Seed.	Drilled	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
ROOT CROPS.							
		The ground for root crops should be well and deeply ploughed.				lbs.	
		good size if sown direct in the field.				All these	crops should be thinned out to allow of their attaining a
Mangles and Sugar Beet (<i>Beta vulgaris</i> L.).	Drilled (drills about 24-30" apart)	...	Summer and Winter	biennial	August, September, February, March, April.	5-8	Owing to the thickness of the hulls of these seeds they should be soaked in water for 12 hours before sowing. If transplanted from a seedbed at a distance of 3 feet by 1 foot an acre will take about 16,000 plants. If sown in drills the seeds should be dropped about three inches apart, and when in the 3rd leaf stage thinned out to about 12 ins. apart. Moist and heavy soils are preferable. Frost resistant.
Turnips and Sweetes (<i>Brassica</i> sp.).	Drilled 18-24" or	Broadcast	Summer and	Winter annual	August to October, March to May.	4-6	Should be sown in lighter land than mangolds and when up thinned out to about 9 to 12 inches apart. Frost resistant.
Carrots (<i>Daucus carota</i> L.).	Drilled 12-18" or	Broadcast	Summer and	Winter annual	February to April, August to October.	6-8	Sow in soil well tilled and free of weeds. Seed should be just covered by the soil. Soil best suited is one of a light nature well manured. When up they should be thinned out to about 6 feet apart.
LEGUMINOSAE.							
Beans	Drilled	...	Summer annual.	...	September to February, August to September.	40-50	Sow in drills 2 ft. 6 ins. apart, the seed to be dropped about 2 feet apart and 1 inch deep. In the East it is better to sow in January or February to escape the ravages of the Bean beetle (<i>Myiabis</i>). Sensitive to frost.

These crops are all rich in nitrogen and will improve the quality of the soil in this respect. Many plants of this order require a fair percentage of lime in the soil to give the best results, and if this ingredient is absent it will be as well to apply it as a manure in one form or another, with the exception of serradella, to the growth of which too much lime is detrimental.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
LEGUMINOSAE —contd. Vetches Spring and Winter.	...	Broadcast	Summer and	Winter annual	September and March, August and April.	10s. 30—40	Valuable as hay and green manuring or as grazing for sheep and cattle. Requires a certain amount of warmth and moisture. For hay it should be cut as it comes into flower. Is not affected by frost.
CLOVERS.							
Broad Red Giant Cow Dwarf White Orinson Japanese Alexandrina Yellow Sand Giant White Aisylke.	Drilled 8-24" apart, or	Broadcast	Summer perennial.	...	January to May, August to September.	15—20	These clovers require moisture to grow to any extent, and thus have so far proved more successful in the East than in the West. Japanese clover stands drought the best. Suitable for grazing cattle and sheep, and for hay making when cut in bloom. Very suitable for feeding to ostriches. The same treatment as is required for lucerne, only more moisture is necessary.
Lucerne ... (<i>Medicago sativa</i> L.).	Drilled 8-24" or	Broadcast	Summer perennial.	...	January to April and August to September.	15—20	In the Eastern Province where weeds are very troublesome in the summer, the lucerne should be sown in drills in autumn, and in summer kept cut until the lucerne gains the upper hand. Suitable to graze all classes of stock, including ostriches. Makes one of the finest hays in the world. Should be cut for hay when about 10% of the crop, is in bloom.
<i>Medicago media</i> Pers.	Drilled 8-24" or	Broadcast	Summer perennial	...	January to April and August to September.	15—20	Same as above.
<i>Medicago arborea</i> L.	Drilled 3-4" apart.	...	...	...	August, September.	Thickly 10—12	Seed should be separated from husk before sowing and not sown more than $\frac{3}{4}$ to $\frac{1}{2}$ inch deep. This variety grows into a strong bush 3 to 4 feet high.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
CLOVERS—contd.							
<i>Trifoliate</i> ... (<i>Cytisus proliferus</i> L.)	Drilled	...	Summer and perennial.	...	September to November and February to May.	lbs. ...	Prior to sowing seed should have boiling water poured over it and left in the water for 24 hours to facilitate germination. It should be sown in drills 3 to 6 feet apart to allow of cultivating between rows. Suitable for all stock but should be left for a couple of years before cutting back. Splendid drought resister.
<i>Sainfoin</i> ... (<i>Onobrychis sativa</i> Lam.)	Drilled 16-18" apart.	Broadcast	Summer perennial.	...	February to May or September to October.	About 30 lbs. clean seed, 4 bushels rough seed.	Heat and moisture are essentials for this crop. Soil of a light sandy nature, rich in lime is the most suitable. Good feed for horses and cattle. If cut just before coming into flower it makes excellent hay. Crop should be treated in most respects like lucerne.
<i>Sulla</i> ... (<i>Hedysarum coronarium</i> L.)	Drilled 15" to 2' apart, or	Broadcast	Summer and perennial.	...	February to March preferably or September to October.	If drilled 8-10 lbs., if broadcast about 15-20 lbs.	This crop grows well in late autumn and early spring. Makes very good hay if cut before flowering and is good food for all classes of stock. It is apt to get coarse if not cut soon enough. This crop should be treated in most respects like lucerne but grows during the off season of lucerne.
<i>Lupinus</i> ...	Drilled 15".	Broadcast	Summer and perennial.	...	September to November or March to May.	50-70	Risk by severe frost should be avoided while the crop is still young. Soil most suited is one of a sandy nature. It is chiefly used as a green manure. One of the richest fodders, but is not relished on account of its bitter flavour. Should not be allowed to seed before it is ploughed in.
<i>Serradella</i> ... (<i>Ornithoglossum sativum</i> Brot.)	Drilled 15-18" apart.	Broadcast	Summer and perennial where frost is not too severe.	...	September to October or January to May.	15-30	Prefers a moist loose limeless soil. A good feed for all stock and makes good hay. This crop may be treated in most respects like lucerne.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
CLOVERS—contd.							
Cowpeas ... (<i>Vigna catjang</i> Walp.).	Drilled 3' apart.	...	Summer annual.	...	August, September, October.	lbs. 9—12	Prefers a loose, sandy loamy soil, but grows well on heavy soils. Heat is an essential to the good growth of this crop. Suitable as a green crop for ploughing under, also for food for dairy cows. Sensitive to frost. Ground should be deeply ploughed.
<i>Melilotus</i> <i>officinalis</i> (Lam.).	Drilled about 18" apart.	Broadcast	Summer	...	September, October.	15—20	Requires a limey soil. It will last for more than one year if cut before it flowers. Will withstand about the same degree of cold as lucerne.
SORGHUM, MILLETS AND MAIZE.	For these crops the ground should be well prepared and deeply ploughed.						
Sorghum ...	Drilled 3' apart, or	Broadcast	Summer annual.	...	September, October.	10—60	Requires a certain amount of moisture. Is a splendid green food for dairy cows, and makes good ensilage. The grain can be used as a feed for fowls. When green the stalks if cut up can be fed to ostriches. Stands drought better than maize when once established. Sensitive to frost.
Millets ...	8—12"	Broadcast	Summer annual.	...	September, October.	10 60	Millets are excellent as a green fodder for cattle and other stock, but especially for cattle. Japanese millet has done exceptionally well, giving two or three heavy crops per season. Boer Manna may be sown later than other millets as being susceptible only to heavy frosts it stands a greater degree of cold than the other varieties.
Maize ...	Drilled 3' apart.	Broadcast	Summer annual.	...	September and October.	30 50 if sown for silage, 15—20 for grain.	Suited for making hay, ensilage, or for grain. In the East, where the mealie grub is troublesome, it is advisable to sow in December, so as to escape, to a certain extent, the ravages caused by this pest. If growing for grain thin out to 3 feet apart both ways. Sensitive to frost.

Variety of Seed.	Drilled.	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
MISCELLANEOUS CROPS.							
Teosinte (<i>Euchlana Mexicana</i>).	Drilled 3 apart.	...	Summer annual.	...	September. October, July to August.	2 4½	Is a stout, leafy plant and yields an enormous amount of green food suitable for dairy cows. Cannot stand the slightest frost. Treat in the same manner as mealies. When up thin out to a foot apart.
Melons and	Gourds.	All these are very susceptible to frost.					
Tsama ...	Drilled 12 x 6.	...	Summer annual.	...	September to November.	2	Soil most suited and one in which it reveals is of a light nature and alluvial. It requires plenty of heat. In its natural haunts, the Kalahari Desert, it grows when the rains fall, from January to April.
Monketaan ...	Drilled 12 x 6.	...	Summer annual.	...	August. September to November.	2	Suitable food for cows and pigs. Grows well on sandy soil and stands drought well. Very heavy cropper, 100 tons per acre, under favourable conditions.
Calabash Pipe Gourds.	Drilled 5'.	...	Summer annual.	...	August, September, July to August.	...	Should not be sown on too rich a soil, otherwise the gourds grow too coarse and are not suitable for pipe bowls. Light soil is most suited for this crop, although it grows well on heavy soils, though often too luxuriantly on the latter.
Rape ...	Drilled 2 to 3.	Broadcast	Summer and Winter	...	August to March.	4-8	This fodder, in conjunction with lucerne, gives an ideal food for ostriches. Cattle and sheep eat it with great relish. Requires a good, rich soil and certain amount of moisture. If sown for ostriches 6 to 8 lbs. seed is required, otherwise 4 to 5 will be found sufficient. In putting cattle and sheep on it for the first time, care should be exercised not to let them on it if it is wet, and only when the edge has been taken off their appetites. With-stands frost in a marked degree.

Variety of Seed.	Drilled	Broadcast.	Summer Crop.	Winter Crop.	Season for Sowing.	Quantity of Seed per acre.	Remarks.
MISCELLANEOUS CROPS —contd.							
Kale ...	Drilled 3'.	Broadcast	Summer and	Winter	September to March and April.	lbs. 1-5 lbs. if broadcast.	Is a fine feed for cattle and also for sheep and ostriches. May be sown in seed beds and transplanted 3 feet all ways. An acre will then take 1,840 plants.
<i>Chou m. eillier.</i>	(see Kale).						
Flax ...	Drilled Broadcast and			Winter	March to May or August.	10-50	The seeds are very suitable for feeding to young calves. Prefers a sandy soil and moist climate. Linseed cake is one of the finest feeds obtainable. Grows well on poor soil.
Chicory ...	Drilled or	Broadcast	Summer		September, July, August.	2-8	The green food has been found suitable for cattle, sheep and ostriches. Almost any soil is suitable, but the lightest sands and heaviest clays should be avoided. Prefers a moist climate. If sown broadcast 8 lbs. seed is required, but if in drills 2 feet apart only 2 lbs. is required. It should then be thinned out to 9 inches apart in the row. If wanted for the root the crop should be lifted when the lower leaves begin to turn yellow, and the roots will break clean though still in the milky stage.
Mustard ...	Drilled	Broadcast	Summer and	Winter	September to January to May.	8-10	Suitable green food for cattle and sheep, and when young has proved excellent for young ostriches. The conditions are the same as in the case of rape.
Sunflower ...	Drilled 3' apart.		Summer		August to November.	10-12	The ground best suited to this crop is one of a light nature, well tilled and manured. When up should be thinned out to 16 to 24 inches apart. Subsequent treatment is the same as for mealies. It should not be sown until all danger of frost is past. Seeds are good food for poultry and ostriches.

PEANUTS.

This crop should be sown when all danger of frost is passed, July and August in the West and September and October in the East. Heat and moisture are absolute essentials for the success of this crop. It takes from three to six months to ripen. The nuts may be planted in ridges or on the flat. Constant cultivation during growth is also essential to obtain the best results. The nuts are planted according to variety, *i.e.*, Running Virginian are planted 2 nuts in each hill 32 feet apart both ways, whereas upright varieties may be planted 8 to 14 inches apart and the rows 3 feet apart. The upright varieties, such as Virginian Bunch, require the least labour in harvesting. Should be harvested before the first signs of frost, and then the ground should fall clear of the nuts like potatoes. The crop is ploughed up in the morning and stacked in small heaps in the afternoon. The method of stacking is as follows:—A pole is planted in the ground and the crop stacked with roots to the centre on cross poles, laid on the ground round the pole. These stacks must be protected from rain, and in 20 days should be dry enough to pick.

CASTOR OIL.

Prepare the soil as for mealies. Seed should be drilled in 7 to 8 feet (smaller varieties may be placed closer), and 2 feet in the row. The seed should be soaked for 18 to 24 hours previous to sowing in order to procure even germination. Two seeds are put into each hill, and the weaker plants are removed when about 8 to 10 inches high. When 3 to 4 inches high they should be moulded up with a double mould-board plough. Seeds are picked when pods are a reddish brown to a peculiar green colour. When picked, the pods should be placed on a floor in the sun, and there will burst and throw out seed. No moisture must reach the seed during this process. Some varieties appear more sensitive to frost than others.

SALTBUSH.

The amount of seed varies as to method of sowing. About 2 to 2½ lbs. is required. The seed is best sown in early spring. *Semibaccatum* and *nummularia* will resist frost in a marked degree, especially the latter. These two varieties are perennial.

COTTON.

Prepare the land as for mealies. The best time for sowing has not been actually ascertained, and can only be done by local experience, but in the West August appears to be the best, when the picking season will come about December to February. In the East, on the other hand, September to October will be the best, bringing the picking season to April and May, when it is dry, and before the frost starts. This plant cannot withstand frost, and the sowing must be regulated accordingly. The seed should be sown in rows according to variety, *i.e.*, Sea Island about 5 feet apart, other varieties 3—4 feet. Five seeds should be planted in each hill, and the hills 12—15 inches apart. When the young plants are about 14 days old the weakest should be removed, leaving the two strongest in each hill. Fourteen days later the weaker of these remaining two plants should be removed, and any vacant places filled with the strongest of the weak ones removed. Cotton requires fertile soil.

DISTRIBUTION OF WHEAT, OATS, AND BARLEY SEEDS FOR THE 1910 SEASON.

Notice is hereby given that the Department of Agriculture has a limited stock of Wheat, Oats and Barley seeds, as enumerated below, for distribution, free of charge, among *bona fide* farmers in the Colony, for the coming sowing season. These seeds are intended solely for purposes of experiment and in applying for same applicants must bear in mind the following conditions:—

(1) Each recipient of seed undertakes faithfully to furnish this Department with a report, on a form provided for the purpose, of the result of the experiment. In the past when an experiment has failed, farmers have been under the impression that a report was unnecessary. This, however, is quite a mistaken idea, for the negative report, from an experimental point of view, is just as valuable as the successful one. It is therefore imperative that, no matter what the result, a report must be furnished this Department in due course.

(2) The seed will be allotted in quantities of 10 lbs. of each variety.

(3) Applications must be addressed to the Government Agriculturist, Cape Town, and will be received up to and including the 31st March, 1910. After that date no application can be entertained. Should the number of applications exceed (at 10 lbs. each variety) the quantity reserved for distribution, applicants will receive preference as far as possible according to priority of date of application.

The following are the varieties which it is anticipated will be available for distribution, viz.:—

Wheats: Gluyas Early.
Tennyson.
Thew.
Boloturka.
Macaroni or Nicaragua.
Rieti (Imported).

Oats: Appler.
Texas (Colonial).
Texas (Imported).
New York State White.
Danish Island.
Smyrna.
Texas Brand Improved, Red Rustproof Winter.

Barley: Webb's Chevalier.
Webb's New Burton Malting.
Webb's Beardless.

STOCK BOOKS FOR FARMERS.

Mr. C. S. Pringle, manager of the Newberry Estate, P.O. Glen Lyon, via Griquatown, writes:—In the November number of your *Journal* I see you kindly give a specimen of a likely stock book for farmers. I am enclosing a specimen copy of the system I have of keeping my stock book, and if you can find space to show it in your valuable *Journal* it may be of some use or assistance to my brother farmers who have asked for a copy of such a book to be published. My totals at end of each month are arrived at by adding and subtracting increases and losses, died, bought or sold, but every day details are kept in my pocket book. I use an ordinary blank foolscap book and rule it every month or for a couple of months myself.

SWEETWATER FARM.

JULY, 1909.

ACCOUNT OR RETURN OF JOHN FRANKLIN'S STOCK.

EXPLANATION.	Merino Sheep.				Cape Sheep.				Angora Goats.				Cattle.						Horses.				Donkeys, Boer Goats, &c.
	Rams.	Ewes.	Lambs.	Hamels.	Rams.	Ewes.	Lambs.	Hamels.	Rams.	Ewes.	Lambs.	Kapeters.	Bulls.	Cows.	Calves.	Heifers.	Tollies.	Oxen.	Stallions.	Mares.	Foals.	Geldings.	
Stock on hand July 1st, 1909 ...	10	500	450	107	2	100	70	80	5	250	160	100	2	50	30	10	20	16	1	5	3	4	
Increase ...	...	...	50	...	...	...	10	...	...	...	...	...	...	...	5	...	...	...	...	...	...	...	...
Bought ...	...	...	...	11	1	...	...	...	...	...	...	...	...	...	...	...	...	6	...	...	...	...	...
Sold ...	...	...	...	56	...	...	...	...	...	...	...	20	...	...	...	...	...	...	...	...	...	...	...
Died ...	1	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	2	...	...	...	1	...	...
Lost ...	...	...	10	...	...	...	...	...	...	20	...	...	...	...	...	...	...	...	...	...	...	...	...
Recovered ...	...	...	3	...	...	...	...	...	...	8	...	...	...	...	...	...	...	...	...	...	...	...	...
Transferred {	...	...	100	...	...	...	...	...	...	...	30	...	...	...	...	...	10	...	...	...	...	...	...
	...	100	...	...	...	...	...	...	...	...	...	30	...	...	...	...	...	10	...	...	...	...	...
Slaughtered ...	...	...	...	3	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Stock on hand July 31st, 1909	9	600	393	57	4	95	50	80	5	238	129	110	2	50	35	8	10	26	1	4	3	4	

Remarks if required :—Merino Rams put in on 26.7.09 ; Angora Rams taken out on 16.7.09 ; One Heifer died of Gall sickness ; Two Ewes of poverty ; Mare broke her leg and had to be shot. All stock low in condition and should have been shifted. Five Lambs killed by Carnivora ; 2 unaccounted for.

EAST COAST FEVER.

STATEMENT OF MEASURES TAKEN TO SAFEGUARD THE COLONY OF THE CAPE OF GOOD HOPE AGAINST THE INTRODUCTION OF EAST COAST FEVER FROM THE ADJOINING COLONIES OF NATAL AND TRANSVAAL.

The following is a resumé of the steps which have been taken by the Government for safeguarding this Colony against the introduction of East Coast Fever from the adjoining Colonies of Natal and Transvaal.

Guarding of Borders.—*Cape-Bechuanaland Protectorate Border (about 300 miles).*—Guarded and patrolled between Ramathlabama and Kuis by 19 C.M.P. and 3 Native Detectives. Camps established at Ramathlabama, Pitsani, Tsedilomolomo, Packenham, Detlaraping and Morokwen.

Cape-Transvaal Border (about 262 miles).—Guarded and patrolled by 34 C.M.P. and 1 Detective. Camps are established at Christiana Gate, Thornhill, Kopje Enkel, Home Rule, Pudimoe, Malalaring, Mosymiyani, Broeders Puts, Welverdiend, Rosaquali, Kraaipan, Maritzani Eye, Rietfontein, Rooigrond, Malmani Road and Ramathlabama.

Cape-Natal Border (about 330 miles).—Guarded and patrolled by 109 C.M.R. and 220 Natives. Three special Native Detectives are also employed in each of the Districts of Umzimkulu and Bizana. Camps are established at Bonnyvale, Stanford's Drift, Brighton, Middleton, Riverside, Railway Camp, Arnold's Drift, Waterfall, Umfulamuhla, Union Bridge, Stranger's Rest, Middleford, Gloucester, Iron Latch, Gugweni Gate, Harding Gate, Staffords Gate, Ingeli Gate, Amanzimyama, Boshof's Drift, Owen's Camp, Mjika Camp, Webster's Drift, Davies' Camp, Impindweni, Lugie, Middledrift, Gunther's Camp, Clark's Camp, Leecon Camp and Umtamvuna Mouth.

An inspection of the Cape Colony-Protectorate Border near Kuis (the most westerly point guarded by this Government), made by the local sub-inspector of the C.M.P., indicated the advisability of stationing men in the vicinity of Kuis and Madebing, and mounting them on camels, as, owing to the long distances to be traversed and the scarcity of water, supervision on horseback was out of the question. Three camels have been purchased for this purpose. Fencing of this border is not considered necessary at the present time.

Border Fences.—The frequency with which repairs of the Transvaal Border fence were needed suggested a thorough inspection of this fence. As a result it was found necessary to overhaul the whole line of fence, which consists in part of four and five wires only. The strengthening of the fence is now completed, the fence consisting of five wires and upwards throughout, except where the standards, being driven into hard, rocky ground, could not be raised so as to carry an additional wire to bring the fence up to the desired height of 4 feet 6 inches. No advantage would have been gained by making these particular sections of the

fence a six strand one, as it would have necessitated at least two of the wires being placed within an inch or two of each other, and even then would not have reached the desired height or in any way added to the efficacy of this section for keeping cattle out.

In those sections of the fence carrying seven wires, the extra strand has been inserted by the owner of the farm which the fence traversed in order to render it proof against small stock.

All additional and renewed wires are barbed and all unsound poles have been replaced with iron standards.

On the Natal Border the fence erected for Rinderpest purposes having been in existence from the Drakensberg to Boshoff's Drift and since repaired, it was only necessary, in order to complete the fencing of the whole of the border, to erect the section from Boshoff's Drift to the sea. This was completed at the end of September, 1908. In the beginning of 1908 considerable pressure was brought to bear in favour of a clear zone along the entire border, and a belt of 800 yards was established, from which all cattle were excluded except cattle to be milked or yoked and those used for the cultivation or removal of produce and transport of goods from the Ports of Entry in that section of the zone extending from the Basutoland border to Ingeli. This was, however, found to be impracticable and also likely to alienate the border farmers in so far as the section from the Drakensberg to the confluence of the Umzimkulu and Ibisi Rivers (about one-half of the border) was concerned; and to that extent the belt was accordingly withdrawn. The same reasons applied also to the portion of the border north of Alfred County; but as this section had not the advantage of a river frontage, it was deemed advisable to erect a double fence about 50 yards from the then existing fence along this extent (about 50 miles), and upon completion of the fence, in August, the 800 yards belt along this section also was withdrawn. Meanwhile, an inspection of portions of the fence along the Umzimkulu River indicated that the fence from the Drakensberg to the junction of the Umzimkulu and Ibisi Rivers (170 miles) needed overhauling, in some parts silt and rubbish having washed up against the fence to a height of 2 feet, thus lowering it to only $2\frac{1}{2}$ feet. Immediate steps were, therefore, taken to effect these repairs, at a cost of about £2,700, the fence being at the same time heightened to 5 feet 6 inches in those parts where the configuration of the ground rendered a height of 4 feet 6 inches inadequate.

Restrictions.—The following are those at present in force:—

- (a) From Natal no cattle, animal produce, grass, hay, reeds, rushes, herbs, plants (other than cultivated ones) or other vegetable matter can be introduced. Through Stanford's Drift and Union Bridge only vehicles and goods not prohibited which have been hauled all the way to the Border by equines from Donnybrook or Ixopo, as the case may be, are admitted. Through Riverside all livestock other than cattle, sheep and goats, and all articles and things whereof the introduction is not specially prohibited and which are not conveyed in cattle trucks are admitted by rail only. This Port is also open for equine transport used solely for the conveyance of passengers and their personal effects. Ingeli and Harding Gates are open only for human beings and their personal effects and mail bags. Mail bags can only be brought through Middledrift, under the supervision of the Border Guard.
- (b) From the Transvaal the introduction of cattle, grass, hay, reeds, rushes, cattle manure, and *green* hides, skins and horns is prohibited. Vehicles drawn by equines can cross the border at any gate, but those drawn to the border by cattle can only enter at

- Rooigrond and Mosymiyani after being outspanned on the Transvaal side, whence they are drawn across the border by mules. *Dry* hides, skins and horns have to be properly cured and dressed, and to be accompanied by a certificate by the Principal Veterinary Surgeon of the Transvaal to this effect. Wool and mohair must be properly baled and come direct to a railway station between Mafeking and Fourteen Streams for consignment to a port without being opened *en route*.
- (c) From the Bechuanaland Protectorate the introduction of all cattle other than slaughter stock is prohibited, and slaughter stock have to be dipped under supervision at Ramathlabama before they enter.
 - (d) From Rhodesia the introduction of cattle, grass, hay, reeds, rushes, and *green* hides, skins and horns is prohibited. *Dry* hides, skins and horns can enter only under the same conditions as in the case of the Transvaal.
 - (e) From the coast north of Durban the introduction of cattle, sheep, goats, buffaloes and antelopes is prohibited.

The grazing or depasturing of any horned cattle on the land lying between the Ingwangwane, Indowana, Umzimkulu and Umtavuna Rivers and the Border Fences is prohibited under penalty of immediate destruction without compensation, while the removal from the same area of grass, hay, rushes, reeds, herbs, plants and other vegetable matter liable to carry ticks is also prohibited.

The importation into or removal from place to place within the Transkeian Territories, with intent to spread East Coast Fever, of any animal or portion of the carcase of any animal or any articles or things which, either by contact with any affected animal or through any other means, are liable or capable or have been rendered capable of transmitting the disease is prohibited under a penalty of £500 or seven years' imprisonment, or both such fine and imprisonment.

An Advisory Board, composed of Europeans and Natives, to assist the local Magistrate, has been formed at Umzimkulu. This Board has been of considerable assistance to the Department, and has been the means of establishing a system of co-operation between the Government and the local people.

Eleven men have been specially appointed for the purpose of repairing any breaks which may occur in the fence along the Natal Border. These men move constantly up and down the fence, each taking a defined section, and at the same time do the duty of guards, while 84 additional Natives have been specially engaged to guard the drifts across the Umzimkulu and Umtavuna Rivers to prevent cattle being smuggled across at night. Twelve extra guards have also been engaged on the land boundary between the Ingeli and the junction of the Ibisi and Umzimkulu Rivers.

Depots have also been established at Riverside, Umzimkulu, Bizana and Port St. John's, where an emergency stock of fencing materials has been stored to enable the Government to cope without delay with any outbreak, in the event of the disease crossing the Border.

Two Veterinary Surgeons have been specially stationed at Umzimkulu and Bizana for examining outbreaks of disease on the border both in this Colony and in Natal territory, for the purpose of identifying the nature of the disease.

Special Legislation (Act No. 17 of 1908 and Proclamation No. 131* of 1909) has been passed giving full powers for dealing with any outbreak of East Coast Fever, and the Department is, therefore, in the position to take prompt measures should it unfortunately be necessary to do so.

The Government has determined to adopt a policy of clearing the districts which border on Natal as far as possible of ticks, and with this object in view, is adopting the following measures, viz. :—

1. Dividing fences between the Lower Locations in the Umzimkulu District and the adjoining properties are being erected under the Fencing Acts as rapidly as possible.
2. A new fence has been erected from Brooks Nek through Pondo-land to the coast, in the event of the necessity hereafter arising for providing a further line of defence. Arrangements are also being made for putting No. 3 fence from Ingeli to Umzimvubu River in a state of thorough repair.
3. Arrangements are being made for the erection of twenty cattle dipping tanks on approved sites and 10 miles or less apart, within which belt periodical dipping will be made compulsory as soon as the tanks are completed.
4. Stock Inspectors have been appointed by the Government for the following Districts, viz. :—

Umzimkulu (2).

Bizana (2)

Mount Currie and Mount Ayliff (1).

5. Supervision of dipping will be provided and dip supplied (a) at cost of owners in European areas; (b) at the cost of the Council in District Council areas, and (c) out of the proceeds of a special tax of 2s. 6d. which will be re-imposed in non-Council Native areas.
6. The offer of monetary grants on the £ for £ principle in aid of the construction of cattle dipping tanks has been withdrawn, and is being superseded by a system of advancing loans from public funds subject to repayment with interest in annual instalments.

As a further precautionary measure, the Districts of Bizana and Umzimkulu have already been proclaimed "suspected" districts, from or into or within which the removal of any horned cattle is regulated by Proclamations Nos. 461 and 462 of 1909 respectively. Transport wagons and goods from adjoining districts of this Colony are only admitted into the Bizana District through Ngabeni Drift, where they are hauled across by a steel cable after the oxen drawing them have been outspanned on the Flagstaff side of the boundary. Sixty Native Guards under the charge of three C.M.R. have been engaged to guard all drifts where cattle may cross or be illicitly introduced, and to patrol the boundary, whilst the Headmen of the Border Locations are also being granted a small monthly allowance in consideration of their rendering similar assistance. Any cattle which may be introduced into the Bizana and Umzimkulu Districts from adjoining districts, in contravention of the Regulations will be impounded by the Headman of the Location in which they are found and isolated as completely as circumstances permit pending an enquiry by the Resident Magistrate and instructions as to their disposal. It may be added that only human beings on foot with their personal effects are permitted to cross the border from Bizana into Natal, and then only through Middledrift.

Owners of farms in the Umzimkulu District who own farms contiguous thereto but situate in an adjoining district, e.g. Mount Currie, are, however, permitted to move their cattle to such contiguous farms (but not to

farms owned by them contiguous to the latter), and vice versa, provided such cattle are not removed beyond the boundary of their farms in the adjoining District.

CATTLE DIPPING.

The Cattle Cleansing Act, No. 31 of 1908, as amended by Act No. 43 of 1909, enacts legislation for preventing the spread of ticks by the removal of cattle. The main provisions of the Act are that tick-infested cattle may not be on any main, divisional or municipal road, nor on any public outspan or commonage, unless they have been cleansed within 14 days, or are proceeding direct to a dipping tank not more than 10 miles from the place of removal, and they must be under the control of a competent person. This does not, however, apply to cattle of persons within the boundaries of their properties. Cattle on such a road or place may be inspected by a Field Cornet, Justice of the Peace, Sheep Inspector or Police Officer, any of whom may demand to see the certificate, or permit required by the Acts. These Officers are also enjoined, if the certificate or permit be not forthcoming, to cause the cattle to be cleansed at the cost of the owner.

By Proclamation No. 11 of 1910, the term "clause" is defined and the form of certificate required prescribed.

The Act has been proclaimed in force in the Divisions of East London, Bathurst, King William's Town, Komgha, Albany, Port Elizabeth, Fort Beaufort, Alexandria, Cathcart, Victoria East, Stutterheim and Peddie. It leaves Divisional Councils to decide whether it shall be enforced in their divisions or not.

Fair progress has been made in regard to the construction of cattle dipping tanks, which are distributed as follows:—

LIST OF PUBLIC AND PRIVATE DIPPING TANKS.

<i>District.</i>	<i>Public Tanks.</i>	<i>Private Tanks.</i>
Albany	Grahamstown	Mount View, Manly Flats, Jericho, Thorneycroft, Glen Boyd, Ballinafad, Southey's Hoek, Ashtondale, Ward Vale, Clay Pits, Frazer's Camp, Bucklands, Crosslands, Hebron, Sweet Kloof, Pleasant Prospect, Mount Pleasant, Woodlands, Middleton, Ellende, Schmit Kop, Woodberry, Retreat.
Alexandria	Alexandria Commonage, Paterson Commonage, Graaff Water, Doornkloof.	Hopefield, Leeuwenbosch, Bushy Park, Hilary, Bluegum Villa, Sea View, De Grip, Thornhill.
Adelaide	...	Saxfold Park, Elandshoek.
Bathurst	Round Hill Outspan, Brak River Outspan, Bathurst.	Greenfountain, Thornhill, Tharfield, Cuylerville, Rokeby Park, Summerhill Park, Kasonga West, Coombs.
Bedford	Klipplaat	Bellevue, Cullendale.
Butterworth	Butterworth Commonage.	...
Cathcart	Cathcart	Thomas River, Waku Valley, Middledrift, Ferndale, Rookin, Howell, Wellington, Cloete Dale.
East London	East Bank Location	Dreyer's Hoek, Prospect, Hillside, Elliottdale, Shelford, Ferndale, Amalinda, Farms 10 and 89 in Ward 5, Farms 154 and 113 in Ward 6, Gonubie Park, Lilyfontein.
Engcobo	Engcobo Commonage	Nil.

<i>District.</i>	<i>Public Tanks.</i>	<i>Private Tanks.</i>
Fort Beaufort ...	Fort Beaufort, Yellow-woods Outspan.	Baddaford, Olive Cliff, Septon Manor, Rocklands, Rietfontein, Clifton, Botha's Post.
George ...	George Town, Diepkloof, Woodville.	Nil.
King William's Town	King William's Town, Berlin Commonage, Keiskama Hoek, Wel-comewood.	Gray's Drift, Gobongo Park, Gonubie, Mowbray Park, Sparkington, Izeli.
Knysna ...	Knysna, Eastbrook ...	Nil.
Komgha ...	Komgha Commonage ...	Lincoln, Kei Bridge, Stainland, Annexation, Mooi Plaats, Farm 267, Kwelera; Farm 292, Farm 287, Waterfall, Keikop, Ewanrigg, Lower Kuku, Lot 46, Westbury, Thorn Park, Denston.
Mount Currie ...	Hermon ...	Fairview, Glen Dower.
Mqanduli ...	Mbozisa ...	Nil.
Nqamakwe ...	Blythswood ...	Nil.
Port Elizabeth ...	Port Elizabeth (in course of construction).	Bushy Park, Little Chelsea.
Peddie ...	—	Pera, Gola Poort, Dunstan, Wool-dridge.
Stutterheim ...	Bolo Police Reserve ...	Cloverdale, Quetta, Wetherrun, Waterford Estate, Woodridge.
Uitenhage ...	Glen Connor ...	Cuyler Manor, Perseverance, Prentice Kraal, Maitland River, Coega's Kop, Tankatara, Aloes.
Umtata ...	Umtata ...	Nil.
Umzimkulu ...	Umzimkulu, Lourdes, Riverside.	Sneezewood.
Victoria East ...	Alice, Calderwood ...	Alandale, Witney, Nottingham.

In addition to the foregoing, cattle dipping tanks, which are available for use by the public, have been constructed by the District Councils in the following Districts of the Transkeian Territories, viz.:—Elliotdale (1), Engcobo (2), Idutywa (1), Kentani (3), Mqanduli (2), Qumbu (1), Tsolo (1), Umtata (3), Umziinkulu (2), Willowvale (1), and Mount Ayliff (2).

In Pondoland 16 tanks have been completed, distributed as follows: Bizana, Libode and Ngqeleni, 3 each; Flagstaff, Lusikisiki and Tabankulu, 2 each; and Port St. John's, 1.

ANIMAL DISEASES—CONTAGIOUS AND INFECTIOUS.
Summary of Outbreaks of Contagious and Infectious Animal Diseases Scheduled
under Act No. 27 of 1893.
Still under Quarantine on 31st December, 1909.

DISTRICT.	Anthrax.	Epizootic Lymphangitis.	Glanders.	Lung-sickness.	Redwater.	Scabies (Equines.)	Sponsziekte.	Tuberculosis.	Totals.
Albert	...	...	1	...	...	...	...	...	1
Aliwal North	...	...	...	...	...	...	1	...	1
Barkly West	...	...	...	1	...	...	...	...	1
Calvinia	...	...	1	...	...	...	...	...	1
Cape	...	...	...	...	...	...	...	2	2
East London	1	...	...	5	...	...	3	...	9
Herschel	1	...	...	...	...	...	...	...	1
Humansdorp	...	1	...	...	...	4	...	...	5
Kimberley	1	...	...	...	...	...	...	...	1
King William's Town	1	...	...	5	...	...	2	...	8
Middel-drift	...	...	...	...	...	...	1	...	1
Komgha	...	...	...	7	...	...	1	...	8
Kuruman	2	...	...	...	...	...	...	...	2
Mafeking	1	...	...	...	...	...	1	...	2
Peddie	...	...	...	2	...	...	...	...	2
Port Elizabeth	...	...	...	...	...	1	...	...	1
Stellenbosch	...	...	...	...	...	...	...	1	1
<i>Tembuland.</i>									
Umtata	...	...	...	7	...	...	...	...	7
Engcobo	...	...	...	16	...	...	...	...	16
Xalanga	...	...	...	1	...	...	...	...	1
Elliot	...	...	...	...	...	...	1	...	1
St. Mark's	...	...	...	2	...	...	...	...	2
Mqanduli	...	...	...	3	...	...	...	...	3
Elliotdale	...	...	...	4	...	...	...	...	4
<i>Transkei.</i>									
Butterworth	...	...	...	6	...	...	5	...	11
Kentani	...	...	...	2	...	...	13	...	15
Nqamakwe	1	...	...	4	...	1	6	...	12
Tsomo	...	...	...	4	3	...	...	...	7
Idutywa	...	...	...	8	...	...	...	...	8
Willowvale	...	...	...	8	...	...	14	...	22
Port St. John's	...	...	...	1	...	...	...	...	1
<i>Pondoland.</i>									
Libode	...	...	...	2	...	...	...	...	2
Ngqeleni	...	...	...	4	...	...	1	...	5
Lusikisiki	...	...	...	4	...	...	...	...	4
Flagstaff	...	...	...	1	...	...	...	...	1
Tabankulu	...	...	...	12	...	1	...	...	13
<i>East Griqualand.</i>									
Mount Ayliff	...	...	...	1	...	...	2	...	3
Umzimkulu	...	...	...	...	...	...	2	...	2
Qumbu	...	...	...	2	...	...	...	...	2
Tsolo	...	...	...	7	...	...	...	...	7
Mount Frere	...	...	...	3	...	...	...	...	3
Mount Fletcher	...	...	...	1	...	...	...	...	1
Totals	8	1	2	123	3	7	53	3	200

GEORGE ROWE, for Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 3rd February, 1910.

DESTRUCTION OF PRICKLY PEAR.

EXPERIMENT WITH ST. O'GORMAN'S PRICKLY PEAR EXTERMINATOR.

On the 11th September last a demonstration was made with the above Prickly Pear poison by the proprietors of the preparation, under the supervision of Mr. A. Kay Hards, Assistant to the Government Agriculturist, with a view to proving the efficacy of the poison as an exterminator of the prickly pear.

For the purpose of the experiment a piece of land in the East London District was chosen. This land was one eighth of a morgen in extent, and was covered by a fairly dense growth of prickly pear of which the large stems and main trunk were pierced by a long sharp pointed rod, to assist the action of the poison which in the proportion of 1 gallon of mixture to 25 gallons of water, was sprayed over the tree, the spraying being continued until the whole bush was practically wetted and the mixture began to drip off.

This work was carried out by 5 boys, each working 2 hours, and the quantity of material used was 2 gallons. The cost therefore of treating one morgen of prickly pear infested land would be as follows:—

	£	s.	d.
Labour, 5 boys, 16 hours at 2d. per hour	0	13	4
Material, 16 Gallons O'Gorman's P.P. Exterminator, retailed at 3s. 3d. per gallon	2	12	0
Cost per 1 morgen for which 400 gallons water would be re- quired	£3	5	4

Unfortunately the pump used for the above experiment became defective, which necessitated the service of two additional boys, and allowance should be made for this extra labour when taking the above cost into consideration.

On the 8th October following the plot was again visited, and the prickly pear was found to be in a shrivelled and altogether distressed condition, and a subsequent visit, ten weeks after, showed the shrubs quite dead and in a condition fit for being burned. It was also found that though the branches drop off to a certain extent before they are quite dead, they perish on the ground.

It may here be mentioned that the day after the preparation was applied a total rainfall of over three inches was registered, which would point to the conclusion that a heavy shower of rain after application of the poison does not prevent the efficacy of its work.

As stated, 400 gallons of water would appear to be necessary for spraying one morgen, and though this quantity may have been excessive owing to the defect in the pump used for the experiment, it is nevertheless a factor to be reckoned with, and may prove a serious obstacle when the poison is being used in dry parts of the country.

It would also considerably reduce the cost of the labour and lessen the time involved if when treating large areas of prickly pear infested land a large pump with two nozzles and drawn by animals were used.

The thin leaved, sour prickly pear of the Coast was the plant experimented upon, and though softer than the variety found in the Midlands there seems no reason why the St. O'Gorman's Prickly Pear Exterminator should not act equally as satisfactorily on the latter shrub.

ANALYSIS OF FERTILISERS, 1909 SEASON.

In the following table analytical results are given which have been obtained by the analysis of eight samples of fertilisers, taken by myself personally under the provisions of "The Fertilisers, Farm Foods, Seeds and Pest Remedies Act, No. 20 of 1907," from merchants in Cape Town: the guaranteed figures with respect to each sample are printed in italics and where the sample is found to be appreciably below guarantee the figure is printed in thick type. All figures are stated in parts per cent. by weight.

The following abbreviations are used in the last two columns to denote the material from which the fertilisers are stated by the vendors to have been derived:—A. (Ammoniacal); B. (Bone); N. (Nitric or Nitrate); O. (Organic).

As these are the first samples of fertilisers analysed under the Act, a few remarks on the results, particularly regarding the figures for fineness, will not be out of place.

The fineness of the Thomas' phosphate sample is well over that required by regulation which is as follows:—"All articles sold under the description of Basic Slag, Thomas' Phosphate, or Thomas' Slag shall be taken to be guaranteed to be of sufficient fineness to permit of at least 75 per cent. thereof passing through a standard wire sieve of 100 meshes to the linear inch."

In the case of bone meal the figure obtained is just over that required namely:—"Any fertiliser sold as 'bone meal' or 'bone dust' shall be taken to be guaranteed to be of sufficient fineness to permit of at least 80 per cent. thereof passing through a sieve of eight meshes to the linear inch." This sample of bone meal consisted of the following grades:—

Fine—less than $\frac{1}{2}$ m.m. (less than 1/50th inch)	27·71%
Fine medium—between $\frac{1}{2}$ and 1 m.m. (1/50th to 1/25th inch) ...	16·09%
Medium—between 1 and 2 m.m. (1/25th to 1/12th inch)	23·59%
Coarse medium—between 2 and 3 m.m. (1/12th to 1/8th inch) ...	13·58%
Coarse—over 3 m.m. (over 1/8th inch)	19·03%
100·00%	

In the case of all other fertilisers the figure given for fineness is the percentage sifted through a 1 m.m. sieve, *i.e.*, 1/25th inch.

In connection with these and future analyses of fertilisers under the Fertilisers Act, it will become necessary to prescribe the limits above which it shall in all cases be compulsory to maintain the proportions of fertilising constituents in fertilisers sold under guarantee.

Manufacturer, Vendor or Importer.	Name of Fertiliser.	Brand of Fertiliser.	Fin- ness	Water soluble	Phosphoric Oxide. Citrate soluble	2 Citric solution	Total	Nitro- gen %	Potash	Lime	Form in which Nitrogen is present.	Form in which Potash is present.
Woodhead, Plant & Co., Cape Town.	Thomas' Phosphate...	Hout Kop	83.76	Nil	11.99	16.27	16.73	...	...	48.04		
do.	Guaranteed ...		82.20	...	...	14.59	16.49	...	...	51.91		
	Superphosphate ...	Hout Kop	98.28	12.20	13.60	...	13.00	...	...	21.94		
	Guaranteed ...		...	12.55	12.93	...	14.08	...	...	16.66		
White, Ryan & Co., Cape Town.	Pure Ground Bone ...	Os Kop ...	80.97	Nil	13.79	...	20.25	3.64	...	27.38		
	Guaranteed ...		...	...	...	...	21.00	3.75	...	...	B	
do.	Tree, Vine & General	No. 1	72.23	Nil	5.04	...	9.71	2.835	2.93	17.89		
	Guaranteed ...		...	...	...	...	10.00	2.50	3.50	12.00	O & N	Kraal Ash
do.	Potato and General Garden.		84.51	Nil	6.27	...	11.21	4.025	2.63	21.35		
	Guaranteed ...		...	...	...	...	8.00	3.00	4.50	11.50	O & N	Kraal Ash
do.	Tree, Vine & General Garden No. 2.		69.74	Nil	6.70	...	10.63	2.765	2.63	16.17		
	Guaranteed ...		...	...	...	...	10.00	2.50	3.50	12.00	O & N	Kraal Ash
R. Wilson, Son & Co., Cape Town.	Potato Fertiliser	Adam's ...	71.17	7.09	9.10	...	9.32	3.080	5.40	17.63		
	Guaranteed	Phoenix ...	...	6.42	...	...	7.78	3.70	3.00	9.21	O & A	Chlorine
do.	Vine ...	"	93.24	7.24	8.84	...	9.13	2.135	4.89	23.27		
	Guaranteed ...		...	7.32	...	...	8.41	2.00	4.00	10.30	O & A	Chlorine

In White, Ryan & Co.'s Tree, Vine and General Garden Fertiliser No. 1 the Nitrogen was supplied in form of Nitrate, and in No. 2 by means of Guano.

The following limits of error are recommended :—

Description of Fertiliser.	Limits of Error.				
	Phosphoric Oxide.		Nitro- gen.	Potash.	Lime.
	Soluble.	In- soluble.			
1. Superphosphates...	5	...	...	...	2
2. Dissolved Bones (Vitriolized or Vitriolated) made from Raw Bones and Acid only					
(I) When the total of the percentages of Phosphoric Oxide (soluble and insoluble) stated in the invoice amounts to 16 or more, then—					
(a) If the excess of the actual percentage of insoluble Phosphoric Oxide over that stated in the invoice is 1.5 or more ...	2	...	5	...	3
(b) If such excess is not less than 1, but is less than 1.5 ...	1.5	...	5	...	3
(c) If such excess is not less than .5, but is less than 1 ...	1	...	5	...	3
(II) In all other cases ...	5	1.5	5	...	3
3. Bone Compounds ...	5	5	5	...	3
4. Compound Manures (other than Bone Com- pounds, but including Dissolved or Equalised Guano) ...	5	5	5	5	5
5. Sulphate of Ammonia ...	...	...	5	...	...
6. Nitrate of Soda ...	...	...	5	...	...
7. Ground Hoofs and Horns ...	...	...	5	...	...
8. Dried Blood ...	...	...	5	...	...
9. Fish Guano and Meat Meal ...	...	1	5	...	...
10. All Cakes and Meals (other than Bone or Meat Meal) ...	...	...	5	...	...
11. Ground Bones and Bone Meal ...	...	1	5	...	3
12. Basic Slag and Basic Superphosphate ...	1*	1	...	...	5
13. Shoddy, Wool, and Hair Waste ...	...	...	1	...	...
14. Kainit and other Potash Salts—					
(a) Where the percentage of Potash stated in the invoice does not exceed 15 ...	...	...	...	1	...
(b) Where such percentage exceeds 15 ...	...	...	...	2	...
15. Nitrate of Potash ...	...	...	5	2	...
16. Peruvian and other natural Imported Guanos—					
(a) Where the percentage of insoluble Phosphoric Oxide stated in the invoice does not exceed 15 ...	...	1.5	...	5	3
(b) Where such percentage of insoluble Phosphoric Oxide exceeds 15 ...	...	2.5	...	5	3
(c) Where the percentage of Nitrogen stated in the invoice does not exceed 3 ...	...	...	5	5	3
(d) Where such percentage of Nitrogen exceeds 3 and does not exceed 5 ...	...	...	7.5	5	3
(e) Where such percentage of Nitrogen exceeds 5 ...	...	...	1	5	3

* That is, soluble in a solution of Citric Acid of the prescribed strength.

The meaning of the above table may be explained by an example or two. If a superphosphate is guaranteed to contain a minimum of 15 per cent. soluble Phosphoric Oxide, no liability will attach to the vendor unless

the percentage be found to fall below 14·5. In the case of a Potash Salt guaranteed to contain 18·5 per cent. of Potash and found to contain only 16·9 per cent. the seller will not be liable, but there will be liability if the percentage should fall under 16·5 per cent.

The figures obtained on the analyses of the above samples in some show considerable variations from those registered by the vendors—especially is this the case with the percentages given for Lime.

The samples of Thomas' Phosphates and Superphosphate of Messrs. Woodhead, Plant & Co. are up to guarantee in all respects.

Of Messrs. White, Ryan & Co.'s samples, in the Potato and General Garden Fertiliser, the Potash is 1·87 per cent. below guarantee. The potash in the Tree and General Garden Fertiliser No. 1 is ·57 per cent. below guarantee, and in the Tree, Vine and General Garden Fertiliser No. 2 it is ·87 below the guarantee.

In R. Wilson, Son & Co.'s Potato Fertiliser the nitrogen is ·62 per cent. below the guarantee.

E. V. FLACK.

Analyst under Act 20 of 1907.

THE RATE OF DISTILLATION OF VOLATILE CONSTITUENTS IN THE MANUFACTURE OF PURE WINE BRANDY.

By J. LEWIS, M.A., Government Analyst.

(Paper read before the Cape Chemical Society, November 26, 1909.)

The following analyses were undertaken in order to determine the rate at which the various volatile constituents of wine are distilled in ordinary practice in the Cognac Still.

The distillation was in each case conducted in my presence by Mr. R. Santhagens at his distillery, Bosman's Crossing, Stellenbosch. The still used was a Cognac Still of a capacity of 150 gallons and one leaguer (127 gallons) was distilled by means of live steam in each experiment.

The material in experiment A was a spirit (37.4 alcohol volume per cent.) obtained from white wine vintage, 1908, distilled in the common type of farmer's still. Neither voorloop nor nalooop (first-runnings and after-runnings) had been removed, so that we may look upon the liquid as practically the volatile constituents of wine (less water) concentrated to about one-third of the original bulk.

The distillation B was conducted on one leaguer of white wine (vintage 1909) of an alcoholic strength of 12.93 per cent. by volume.

The samples for analysis were drawn in different ways. In the case of A a sample was taken from each successive portion of the distillate, in B the first sample was taken from the first five liters of distillate and the remaining samples were taken at the end of the distillation of the successive quantities as noted in the second column of the table below.

The total quantity distilled amounted to 380 liters in the case of A and 185 liters in the case of B. The distillations were conducted on June 18th and October 14th, respectively, and the analyses were proceeded with immediately, volatile acids and ethers being first determined in order to avoid esterification in the samples.

The tables herewith show the time taken in the distillation of the individual fractions (averaging about 1 liter per minute in the case of A, and 1 to $\frac{3}{4}$ liter per minute in B), the bulk and alcoholic strength of the successive fractions, and the proportion of secondary constituents per 100,000 of distillate and per 100,000 of absolute alcohol in the distillate.

Fraction.	Vol- ume in liters.	Time taken for distilla- tion in minutes.	In grammes per 100 liters distillate.					In grammes per 100 liters absolute alcohol.							
			Alcohol volume per cent.	Volatile acid.	Alde- hydes.	Fur- fural.	Ethers.	Higher Alcohols (A.M.)	Total second- ary con- stituents.	Volatile acid.	Alde- hydes.	Fur- fural.	Ethers.	Higher Alcohols. (A.M.)	Total second- ary con- stituents.
A.															
Voorloop	1	10	77.08	8.7	22.1	.081	833.8	414	1278.7	11.2	28.7	.11	1081.8	537	1659.5
	2	10	77.65	8.0	14.9	.091	641.5	375	1039.5	10.3	19.2	.12	826.2	483	1338.8
	3	20	77.13	8.0	13.6	.10	338.8	264	624.5	10.4	17.7	.13	439.3	342	809.5
	4	20	76.99	9.4	5.4	.11	301.4	159	475.3	12.2	7.0	.14	391.5	207	617.8
	5	30	76.23	9.4	3.1	.13	164.6	117	294.2	12.3	4.1	.17	215.9	154	386.5
	6	40	74.76	9.9	1.1	.15	68.2	92	172.2	13.2	1.5	.19	91.2	123	229.1
	7	40	71.94	13.2	trace	.19	37.8	73	124.2	18.4	trace	.26	52.6	101	172.3
	8	40	68.65	14.8	trace	.31	37.0	57	109.1	21.6	trace	.45	53.9	83	159.0
	9	40	63.15	18.3	trace	.37	40.5	46	105.2	28.9	trace	.58	64.1	72	165.6
	10	30	53.60	25.4	nil	.40	46.6	26	98.4	47.5	nil	.74	87.0	49	184.2
	11	20	44.02	31.4	nil	.36	47.5	15	94.3	71.2	nil	.81	103.9	34	209.9
	12	20	35.05	39.4	nil	.34	67.8	10	117.5	112.2	nil	.96	193.4	29	335.6
	13	20	25.39	42.5	nil	.32	71.3	trace	114.1	165.3	nil	1.24	280.7	...	447.2
	14	20	16.47	47.5	nil	.29	60.7	nil	108.5	288.5	nil	1.80	368.7	...	659.0
	15	20	9.29	53.1	nil	.22	51.1	nil	107.4	571.5	nil	2.37	582.6	...	1156.5
B.															
Naloop	1	5	63.00	36.0	53.5	nil	615.1	408	1112.6	57.3	84.9	nil	973.1	647	1762.3
	2	5	60.30	46.2	36.2	nil	398.3	152	542.7	76.6	60.0	nil	511.3	252	899.9
	3	10	58.87	46.8	21.6	nil	176.9	114	359.3	79.5	36.7	nil	300.5	194	610.7
	4	20	55.84	40.1	7.7	.02	107.4	87	242.2	62.9	13.8	.04	192.3	156	425.0
	5	20	52.95	38.7	2.5	.03	72.2	62	175.4	73.1	4.7	.06	136.4	117	331.2
	6	20	47.51	38.7	.5	.08	56.4	46	141.7	81.5	1.9	.16	118.7	97	298.4
	7	20	41.08	40.8	nil	.16	42.0	37	120.0	97.4	nil	.39	100.0	90	287.8
	8	20	34.60	45.0	nil	.28	31.8	20	97.1	130.0	...	.81	91.9	58	280.7
	9	20	24.92	48.6	nil	.42	18.5	...	67.5	195.0	...	1.69	74.2	...	270.9
	10	20	18.02	49.5	nil	.62	11.0	...	71.1	274.7	...	3.46	61.1	...	339.3
	11	20	11.65	53.7	nil	.41	5.3	...	59.4	460.9	...	3.49	45.5	...	509.9

The Brandy obtained in the distillation, viz.:—Fractions 3—11 of A and the whole distillate of B, had the following composition:—

Alcohol.	Per 100 liters distillate.					
	Volatile Acid.	Aldehydes.	Furfural.	Ethers.	Higher Alcohol (A.M.)	Total secondary constituents.
A. 67·07	15·5	2·4	·26	96·9	89	204·1
B. 40·23	44·0	6·2	·25	81·4	61	192·9

Per 100 liters Absolute Alcohol.

Volatile Acid.	Aldehydes.	Furfural.	Ethers.	Higher Alcohols (A.M.)	Total secondary constituents.
A. 23·0	3·6	·38	144·4	133	304·4
B. 109·1	15·4	·62	202·3	151	478·4

The residue in the Still was partially analysed:—

Alcohol.	Per 100 liters residue.			
	Volatile Acid.	Aldehydes.	Furfural.	Ethers.
A. ·53	65·9	nil	·19	21·1
B. ·63	72·7	nil	·14	...

For convenience I have plotted the results on squared paper, herewith. In each diagram abscissae represent liters of distillate; ordinates, the constituents on scales varying for the individual groups of compounds.

The diagram A shows Higher Alcohols, Ethers, Aldehydes, Furfural, and Volatile Acid to the following scales:—

3 scale divisions = 10 grammes Higher Alcohols.	
= 20 grammes Ethers.	
= 1 gramme Aldehydes.	} per 100 liters distillate.
= ·01 gramme Furfural.	
= 1 gramme Volatile Acid	

In B the scales are:—

3 scale divisions = 5 grammes Higher Alcohols.	
= 5 grammes Ethers.	
= ·5 grammes Aldehydes	} per 100 liters distillate.
= ·005 gramme Furfural	
= 1 gramme Volatile Acid	

The composition of the two distillates show considerable differences. The Furfural, Ethers, and Higher Alcohols are much the same but in B the Volatile Acid and Aldehyde are far greater than in A. It may be noted that despite the low acidity the Ethers in A are slightly higher than in B. This may be due to the greater esterification in A due to the greater age of the wine. Another explanation is that the acid indicated by the distillate and residue in A is only a fraction of the original acid of the wine for, as the figures above show, only a portion of the Volatile Acid distills over in practice.

The curves show very clearly the rate of distillation of the various products. Considering the two upper diagrams it will be noticed that the Alcohol and Volatile Acid both show irregularities at the beginning of the distillation. In A the Volatile Acid slightly decreases, in B it increases and then falls. The Alcohol in A is higher in the second fraction than in the first. Possibly these abnormalities are due to a little water in the condensing worm. Ethers, Higher Alcohols, and Aldehydes come over very rapidly, three fourths appear in the first quarter of the distillates, and the voorloop contains considerably more of the Higher Alcohols than one would expect.

Volatile Acid and Furfural appear in increasing quantities as the distillation proceeds. The difference between the two acid curves is probably due to the temperature of distillation which is considerably lower in A on account of the high content of Alcohol.

The curves for Furfural are peculiar, in both cases rising to a maximum and then falling. This cannot, at all events in the case of A, be due to continuous production of Furfural from Carbohydrates during the distillation as A contained only a trace of Extract from the cask. I am unable to suggest any explanation.

Irregularities in the curves may be due to the approximate methods of analysis used or to the fact that we are dealing not with definite compounds but with groups of homologous substances so that each curve is actually the summation of a number of different curves.

I desire to express my thanks to Mr. R. Santhagens for affording me the opportunity of obtaining the necessary samples and to my assistant, Mr. Thomas, for making the diagrams.

(The diagrams mentioned will be published with reprints of the above by the Cape Chemical Society.)

MILK RECORD.

ELSENBURG COLLEGE HERD.

Subjoined is the Milk Record to the 31st January, 1910 :—

Breed and Cow.	Days in Milk.	YIELD IN LBS.		
		During January.	Total to date.	Daily Average.
FRIESLANDS.				
Cleopatra	273	351	9,417	34.5
Victoria	250	93	8,001	32.0
Vera	222	573	5,784	26.0
Violet	203	516	6,000	29.6
Bell	191	660	7,122	37.3
Belladonna	154	522	3,427	22.3
Rose	87	1,093	3,416	39.2
Daisy	6	273	273	45.5
Beauty	6	187	187	31.2
JERSEYS.				
Gertie	266	280	5,891	22.1
Gwendolen	222	451	4,880	22.0
Grace	222	397	4,123	18.6
Gladys	215	340	4,839	22.5
Gus	172	498	3,745	21.8
Fanny	160	429	3,073	19.2
Gilliflower	153	495	3,859	25.2
Glee	106	580	2,302	21.7
AYRSHIRES.				
Queen Dot	211	407	4,666	22.1
Lobelia	200	530	5,001	25.0
SHORTHORN.				
Maggie	201	615	5,751	28.6
CROSS.				
Bessie	222	576	8,702	39.2

CAPE FRUIT FOR AMERICA.

VISIT OF TRADES COMMISSIONER TO NEW YORK.

The Trades Commissioner (Mr. C. du P. Chiappini) writes to the Under-Secretary for Agriculture, under date December 24 :

I have to report that, acting under your instructions I proceeded to New York, leaving on the 27th November and returning here (London) on the 20th instant. Before leaving I interviewed several of the leading agents in London of shippers of Cape fruit. I made myself acquainted with the difficulties they had experienced in the past in connection with the shipment of fruit to New York and learned their views as to the manner in which their agents in New York attended to the business entrusted to them. I also communicated with the different shipping lines trading with England and America, so as to be acquainted with the rates of freight and the facilities offered for the transportation of the fruit. I was thus acquainted with the position, besides which I have had considerable experience in connection with matters of this kind, as I had on previous occasions made similar enquiries in other centres.

After I had thoroughly completed my investigations in New York I hurried back so as to be able to place you in possession of the information obtained as soon as possible, in order that the shippers of fruit might take advantage thereof during the present fruit season. I must therefore ask you and the shippers to look upon this as a preliminary report.

Upon my arrival in New York I immediately proceeded to the agency of the Standard Bank, which is in the charge of Mr. W. H. MacIntyre, who placed a room in his office at my disposal and who, together with his staff, gave me every assistance and advice possible, which was of the greatest value to me in the execution of my duties. An hour after I arrived I had already placed myself in communication with some persons in the fruit trade, some of whom I interviewed before that night. After this and throughout my stay in New York I interviewed many persons connected with the fruit trade in all its different branches, and made myself thoroughly conversant with the conditions prevailing there in so far as it might affect the Cape fruit.

I found that the fruit trade in New York may be divided in four main classes.

(A). *Those connected with Public Auctions.*—Those are usually Companies. Sometimes these auctions are managed by the Railway Co., connected with the transportation of the fruit, a large auction hall being provided on the wharf. Sometimes these companies are connected with a large Building Co., who lets numerous offices in their building and provides auction and sample rooms in the same building. The companies undertake the sale of the fruit on a commission; they issue printed catalogues before the sale and re-publish these after the sale with the

prices; this assures the seller of the exact price realised in each case. These auction companies are not supposed to act as consignees or agents for fruit shippers.

(B). *Fruit Brokers or Receivers and Distributors of Fruit.*—These generally do not usually call themselves commission agents. They say their duty is to place fruit consigned to them either with the public auctions or in any other class of the trade to be sold on commission as they think most advisable, or to ship it to any other market if they find they can do better for their clients.

(C). *Wholesale Fruit Dealers.*—Also known in New York as Subsistence suppliers and export merchants. Some of these firms will accept fruit on consignment to be sold on commission, though they do not like to own up to this class of business. They may be more correctly described as speculators or dealers in fruit.

(D). *Retail Dealers in Fruit.*—These are the fruit shops proper, but even the best of them go in for other trades as well in the same shop, such as fruit syrups, aerated waters, dried fruits, sweets, etc. They are the distributors of fruit in so far as New York is concerned.

I will now deal with the result of my enquiries under the headings of your instructions to me, as contained in your letter to the Agent General, dated 27th October, No. B6340/110.

(A). *What competition is likely?*—After careful enquiry I find that there are no fruits on the New York and surrounding markets of the same nature as the Cape fruits which it is proposed to ship, during the months of January, February, March and April; the fruits which are on those markets at that time do not come into direct competition with the Cape fruits, but under certain circumstances may influence the prices. I find that these markets are well supplied with the following fruits during that period of the year: apples, oranges, grapefruit, naartjes, bananas and the later or winter varieties of California pears, which are kept in cold storage.

(B). *What prices are likely?*—It is quite impossible even to guess at what prices are likely to be made. None of the fruit dealers wish to express an opinion upon this matter. The prices will much depend upon the quality, the condition and quantity of the fruit shipped, and they will vary in accordance with the supplies of other fruit and the condition of the weather. I may, however, say that it is probable, all other things being equal and for limited quantities until the markets are more developed, that prices for Cape fruit in New York should be 25 to 50 per cent. above the prices made in London.

(C). *Who would be good agents to consign to?*—As it is necessary to deal with the personal character and financial standing of people in connection with this question, I think it will be more advisable to answer the question in a private memorandum, which is attached hereto, and it should be discussed by prospective shippers in a confidential manner.

(D). *On what lines should arrangements be made with them?*—Consignees or agents for the shippers should be paid not more than 7 per cent commission, which is to cover the commission to be paid to auctioneers or special agents, other disbursements such as duty, landing charges, etc., will be charged to the shippers. In discussing the question with the agents who are willing to accept consignments, I impressed upon them that it is very necessary:—

(a) That their principals should be well informed upon the condition of the market, the future prospects, the classes of fruit which should be shipped, the condition in which the fruit arrived, the prices realised and any other information as a guidance to the shipper to regulate the shipments, for which purpose cable codes must be arranged.

(b) Account sales with remittances must be forwarded as early as possible after the arrival of the fruit.

c) Consignees should at the commencement take a great deal of trouble, more than they would otherwise take for ordinary fruit, as the Cape fruit will be new to the buyers. They should also advise the buyers by circulars previous to the arrival of the fruit, and invite them to attend the sales, and generally make a special effort to push the fruit on the market.

(E). *What system of distribution is advocated?*—My advice to shippers is to select a good man and to leave it to him to do the distribution. In so far as New York is concerned I think the system of public auction is the best, and it is the generally adopted system there and shippers are in a position to verify their sales by means of the catalogues. By this means of sale I do not think that very high or fancy prices will at first be obtained, but I think it will be the means of making the fruit known and the ultimate result will be more satisfactory.

During the forthcoming season and until shippers are more acquainted with the conditions of the American market, I would recommend them to leave it to their English agents to forward to New York such quantity of fruit as they may from time to time deem advisable, for the reason that they will be better acquainted with the conditions in New York, as compared with the conditions prevailing at this moment in England, and that they will be in a better position to regulate the quantities and watch the interests of their principals than could be done by shippers themselves in the Cape Colony.

(F). *What opening is there?*—After exhaustive enquiries I have come to the conclusion that New York and the surrounding markets will, at the outset, take limited quantities of Cape fruit if it arrives in a sound condition, but, as has been our experience in developing other markets, these will gradually increase. In connection with my enquiries as to the exact classes and varieties of fruit that should be shipped, I met with varied and contradictory replies, in consequence of which it is quite impossible for me to recommend any particular class of fruit, excepting that I would suggest that Japanese Plums, Peaches, Nectarines, and Grapes be shipped. I do not recommend Pears, though some dealers think they may be sent, perhaps experiments of small quantities may be made, but my advice is to make experiments of the different varieties of each of these classes of fruit throughout this season, and thus ascertain which varieties the New York market would prefer. For instance, I was told by one high-class retailer that they would not favour the red flesh Plums, such as "Satsuma" and "Apple Plum." He said they would prefer "Kelseys" and "Wicksons"; he may, however, be wrong. I was introduced to one gentleman and was told that he was the "doyen" of the retail fruit trade in New York, and he said to me, "For goodness sake don't send peaches!" while several other dealers specially asked for them. I was generally informed that there would be no objection in New York to the Yellow-flesh peaches, if of good flavour, and that they may be preferred to the White-flesh peaches. From what I could gather there is a fairly unanimous opinion that grapes, if in good condition, will make very good prices, but as I have said before, all this will have to be proved by experiments.

(G). *What facilities for transport from England to America?*—While in New York I interviewed Mr. Franklin, the vice-president of a shipping combine, which manages the White Star Line, American and Atlantic Transport Lines. From him I learned that the two former lines will discontinue their running of steamers during the winter months between Southampton and New York on Saturdays, but that the Atlantic Transport Steamers will call every Saturday with the exception of three days,

February 12 and 19, and March 19, and sail from there at 12 (noon). These ships will, however, call regularly every Wednesday. I explained to Mr. Franklin the position and asked him for special low rates. He then gave me the addresses of their London and Southampton representatives, promising to write to them and suggest that the lowest rates possible should be granted. He has written and I have already seen these representatives and had a preliminary discussion with them. I am also in communication with the Union-Castle Co., and am asking them to make such arrangements that the fruit intended for America should be so stowed as to make it easily accessible when their boats arrive. I am further discussing this matter with the representatives of the different shipping companies, as well as with the agents of the Cape fruit shippers during the forthcoming week and will supply you with further information by next mail.

(H). *What is the shortest and best way of getting fruit to America.*—Though steamers run from America to South Africa, they do not return, and even if they did I do not think it would be safe to use them for the purpose of shipping fruit. The best way is to ship via Southampton, and to fall in with the arrangements I am now making, as reported under the previous heading.

Further, I have to report that I enquired as to the condition in which the Cape Fruit arrived in New York during the previous seasons, and am informed that it did not arrive in a bad condition, but when I enquired in England as to the methods adopted in forwarding same, I am surprised they did not arrive there in a very much worse state. The fruit had been kept over sometimes a week and in other cases had been sent to London and back to Southampton for shipment to New York. If this market is to be taken advantage of at all, the fruit must be handled as little as possible and shipped as quickly as possible from Southampton, certainly not later than the Wednesday after the arrival of the Cape steamer.

The Customs Duties on peaches, apples, plums and pears would be 25 cents per bushel, and for grapes in barrels or other packages, 25 cents per cubic foot of capacity of the package.

I have made a rough estimate of what the additional charge would be for shipping fruit from Southampton to New York, adding freight at about 35s. per ton—40 cubic feet—duty as above and about $7\frac{1}{2}$ per cent. commission, plus other charges, and have arrived at the following rough estimate:—

Peaches and Nectarines	...	...	...	1s. 7d.
Plums	...	...	...	1s. 4d.
				All per box.
Grapes—10 lb. boxes	...	...	...	2s. 2d.
Pears	...	...	...	2s. 3d.

LOSSES IN TRANSPORTATION AND STORAGE OF FRUIT.

EXTRACT FROM A MEMORANDUM ON THE FRUIT TRANSPORTATION AND STORAGE INVESTIGATIONS IN 1909.

By G. HAROLD POWELL, Pomologist in Charge of Fruit Transportation and Storage Investigations, U.S. Department of Agriculture.

(Read before the American Warehousemen's Association, Dec. 2, 1909.)

The fundamental factors that influence the keeping of fruit are few and simple. It requires no profound learning to understand them. Like the Ten Commandments they can be made plain to anyone who reads, but their application to the practical side of fruit handling seems to be not less easy than the application of those scriptural injunctions in the busy life of a warehouseman or of a fruit grower. They need reiterating as well as practising over and over again in order to make them effective in every day life.

Sound fruit cooled quickly after harvesting, either in transit or in the warehouse, to the lowest temperature it can stand without injury—these are the underlying factors on which successful fruit keeping rests. We think it within the facts to state that more than 90 per cent. of the difficulties in the transportation and storage of fruits are the result of not practising these simple, plainly-understandable, fundamental factors by those connected with the various branches of the fruit handling business. There are many other questions that apply to the keeping of fruit that are of interest to the investigator and are often important commercially. There are many aspects of these fundamental questions that are imperfectly understood and that require extended investigation, but the results that are developing from the investigations of fruit transportation and storage in every part of the country and with every kind of fruit show that it is the failure to protect horticultural products from disease in growing them, the quick ripening that occurs if the ripening processes are not checked soon after the fruit is harvested and the abuse to which it is subjected in preparing it for shipment, that cause most of the large commercial losses in transportation and storage.

We will not attempt to present new principles or striking facts in this brief paper. What we desire is to bring out again these fundamental factors by referring to the results of two lines of investigation that have been in progress during the present year.

THE FLORIDA ORANGE DECAY INVESTIGATIONS.

It is estimated that Florida will ship from 5 to 6 million boxes of oranges during the present year. In former years with a much smaller crop the losses from decay while the fruit was in transit have reached an

amount not less than 500,000 dollars. The industry had reached a stage where its future was problematical. The decay was generally attributed by Florida growers and shippers and by the receivers to the influence of the weather, the soil, the railroads, the steamships, and to a variety of other causes which affected the fruit after it left the State. Few of them realised that the trouble originated at home. Following the investigation of the same problem in California where the losses varied from three quarters of a million to one and a half million of dollars a year, and where it was found that these losses were due to rough mechanical handling in preparing the fruit for shipment, it has been found that the decay in Florida oranges is due to the same factors which caused decay in the oranges from California. Rough mechanical handling in picking, antiquated packing-house equipment, lack of organisations through which good methods could be put into operation, poor systems of labour handling—these are the main factors which have caused decay in Florida oranges. Under the direction of Mr. L. S. Tenny, who has been in charge of the work in Florida, it has been shown that the losses from decay are unnecessary, and are almost wholly preventable by handling the fruit properly in preparing it for shipment. The work in Florida consists in shipping fruit that has been handled in different ways to northern markets where the decay is determined on arrival and at different periods after arrival. In addition, experiment demonstrations are conducted in packing houses in different sections where fruit is handled and packed in different ways and then held in the house to determine the effect of the methods of handling the crop.

The following table summarises the data obtained in the Florida shipping investigations in the winter of 1908-9.

PERCENTAGE OF DECAY IN FLORIDA ORANGES UPON ARRIVAL ON MARKET AND FOR THREE WEEKS THEREAFTER, 1908-9

Character of Oranges shipped.	Time of Inspection.			
	On arrival.	After 1 week.	After 2 weeks.	After 3 weeks.
Sound—carefully handled (by Department Experts).	0.5	2.6	6.5	10.9
Careful Commercial handling... ..	1.7	5.7	12.4	16.8
Ordinary Commercial handling	2.7	17.2	18.1	22.2

These data bring out clearly the influence of handling the Orange in Florida with different degrees of care on the development of decay. They point to the path that must be followed by the Florida grower and shipper in overcoming the losses that have recently given this delicious fruit an unsavoury reputation in the market. It is not unlikely that it will be found that there are certain weaknesses in the methods of transporting the Florida orange which when corrected would still further reduce the amount of decay.

CALIFORNIA GRAPE SHIPPING PROBLEMS.

The table grape shipments from California amounted to 4,000 carloads in 1908, and will approximate 5,900 carloads in 1909. The vineyard area has been greatly increased in the last few years, and the shipments are likely to reach not less than 10,000 carloads or even more when the young

vineyards come into bearing. The crop has to be harvested now in 60 days. The marketing season as well as the marketing area will have to be extended when the larger yields are realised in order to prevent an over-supply in the months of the present harvesting season. There is a great deal of loss from decay in California grapes in transit and after the fruit reaches the market. For three years we have been trying to determine the relation of the methods of handling and shipping the grapes to the decay in transit and on the market, and to devise methods under which the marketing season can be lengthened. A brief report on this work was made at your meeting last year by Mr. Stubenrauch, who has the matter in charge. During the present year the investigation has been extended. The results of this year's work bring out again the fact that the decay is due primarily to improper handling in picking and preparing the fruit for shipment, that the decay can be practically eliminated by adopting careful methods in the vineyards and packing-houses.

A number of varieties can be held in cold storage several months. The results also show clearly that the decay is much more serious in the upper tiers of packages in a car than in the cooler, dryer air at the bottom.

The tables following will emphasize some of these fundamental factors.

The first table is a summary statement of the experimental shipments of grapes from California to New York showing the decay on arrival in New York and at intervals after arrival in the grapes handled with care by Department experts to prevent bruising, and the grapes handled carelessly under the usual commercial conditions. The table also shows the amount of decay that occurred in the bottom and in the top of the car.

PERCENTAGE OF DECAY IN CALIFORNIA TABLE GRAPES HANDLED IN DIFFERENT WAYS, 1909.

Method of Handling.	On arrival in New York.	3 days after.	5 days after.	7 days after.	Average.
Carefully handled grapes at bottom of car	0.6	1.8	3.4	5.0	2.7
Carefully handled grapes at top of car ...	1.4	3.2	6.8	12.4	5.9
Commercially handled grapes at bottom of car.	3.6	7.2	12.0	15.2	9.5
Commercially handled grapes at top of car	8.4	11.1	19.3	19.7	14.6

These data are self-explanatory. The two points that stand out clearly are:—(1st) That well-handled grapes ship well and keep well after arrival in market, that the decay is serious in roughly handled grapes in transit and progressively so after arrival in market. (2nd) That the decay develops much more seriously in the top of the car than in the bottom, though the difference between top and bottom is much less in carefully handled sound fruit than in grapes that have been injured by careless handling.

The table following is a summary statement of the decay in a series of shipments of grapes on arrival in New York and at intervals after arrival, the fruit having been handled by two groups of commercial shippers in California, both groups of shippers having grapes grown under similar conditions and equally good to start with. The first group of shippers were men who were observed by our experts as handling the fruit with

great care from the vineyard to the car to prevent bruising. The second group were men who were careless in all of their business operations in so far as that applies to the picking, hauling, and packing of the fruit.

PERCENTAGE OF DECAY IN GRAPES HANDLED CAREFULLY AND CARELESSLY
BY COMMERCIAL SHIPPERS, 1909.

Method of Handling.	On arrival in New York.	3 days after.	5 days after.	7 days after.	Average.
Careful Commercial handling, bottom of car.	1.3	2.2	4.3	7.3	3.8
Careful Commercial handling, top of car	1.8	4.8	7.1	9.3	5.8
Careless Commercial handling, bottom of car.	6.7	10.5	14.3	25.2	14.2
Careless Commercial handling, top of car	12.1	17.3	28.9	35.2	23.4

IMPROVEMENT IN REFRIGERATOR CARS NEEDED.

The responsibility for decay of grapes in transit rests primarily on the growers and shippers. The responsibility in so far as the loss occurs while the fruit is in the car lies also with the present method of refrigeration. Refrigeration in transit is used for slow ripening fruit like oranges, lemons and grapes, which decay as a result of improper handling, primarily to retard the decay. It is not used to retard the ripening of the fruit as with peaches, apricots, small fruits and other quick ripening products. If the former fruits were ideally handled, refrigeration would not be needed except that it might be useful in keeping the fruit bright and fresh. On the other hand if the fruit was cooled as quickly in all parts of the car and the air was as dry as it is in the bottom, there would be little decay in fruit that is shipped quickly after harvesting even if it had been improperly handled. Sound fruit is the corner stone on which successful transportation and warehousing rests. Quick even refrigeration in transit is equally fundamental from the transportation standpoint. If the grower and shipper are to be held up to the highest ideal of handling they have a right to demand that every other agency through which their product passes shall be held to an equally high standard in the performance of the service which each renders. This phase of the subject is receiving a great deal of attention from transportation companies at the present time.

OTHER INVESTIGATIONS.

I desire to leave this fundamental idea that while there are a number of serious storage and transportation troubles that are connected with the conditions under which fruit is grown and with the conditions of transportation and of storage, we have undertaken no investigation that has not shown that when the fruit is stored or shipped in a condition not less sound than when it is harvested from the tree, and is cooled quickly after harvesting to the lowest temperature it can stand without injury, the serious losses that have been common in the past are largely eliminated.

CAPE PRODUCE CONDEMNED IN THE TRANSVAAL.

Return of Vegetable Produce from Cape Colony condemned by Transvaal Plant
Inspectors at Johannesburg and elsewhere during the months of November and De-
cember, 1909 :—

POTATOES.

- Nov. 2.—K. S. M., Molteno, 40 bags, Eelworms, 2½ per cent.
 „ 5.—A. Silbert, Cape Town, 34 cases, Fusarium Solani, 15 per cent.
 „ 10.—P. de Villiers, Kuils River, 70 bags, Fusarium Solani, 4½ per cent.
 „ 11.—Bennie & Co., Kimberley, 2 bags, Bacterial Disease, 7 per cent.
 „ 11.—P. de Villiers, Kuils River, 25 bags, Bacterial Disease, 5 per cent.
 „ 15.—P. de Villiers, Kuils River, 20 bags, Fusarium Solani, 11½ per cent.
 „ 20.—Le Roux & Co., Huguenot, 1 bag, Bacterial Disease, 4 per cent.
 „ 22.—J. C. Conradie, Worcester, 1 bag, Fusarium Solani, 15 per cent.
 „ 24.—Geld & Co., Bosman's Crossing, 9 bags, Fusarium Solani, 5 per cent.
 „ 25.—Cellier, Robertson, 1 bag, Fusarium Solani, 20 per cent.
 „ 29.—Geld & Co., Vlotenberg, 32 bags, Fusarium Solani, 3 per cent.
 „ 29.—P. J. de Vos, Worcester, 7 boxes, Fusarium Solani, 10 per cent.
 „ 29.—Geld & Co., Vlotenberg, 30 bags, Fusarium Solani, 2½ per cent.

ORANGES.

- Novr. 6.—Brendenkrus, Passenger, Kimberley, 1 barrel, Citrus Rot, 5 per cent.
 „ 10.—Schumacher, Port Elizabeth, 43 boxes, Citrus Rot, 4½ per cent.
 „ 10.—Schumacher, Port Elizabeth, 23 boxes, Citrus Rot, 11 per cent.
 „ 23.—A. J. Webber, Grahamstown, 1 box, Red Scale, 22 per cent.

LEMONS.

- Novr. 6.—Chisholm & Co., Kimberley, 1 case, Citrus Rot, 8 per cent.
 „ 22.—J. Sarembock, Wellington, 50 baskets, Red Scale, 10 per cent.
 „ 22.—P. G. le Roux, Wellington, 18 baskets, Red Scale, 7½ per cent.
 „ 29.—I. Gell & Co., Komgha, 35 casks, Citrus Rot, 8½ per cent.
 „ 29.—I. Gell & Co., Komgha, 30 casks, Citrus Rot, 11 per cent.

POTATOES.

- Dec. 6.—Kaplan Bros., Bot River, 24 bags, Fusarium Solani, 5 per cent.
 „ 13.—D. du Toit, Huguenot, 21 bags, Fusarium Solani, 2½ per cent.
 „ 13.—Hirsman Bros., Cape Town, 10 bags, Fusarium Solani, 2½ per cent.
 „ 13.—Hirsman Bros., Cape Town, 14 bags, Fusarium Solani, 3½ per cent.
 „ 15.—Gell & Co., Vlotenberg, 27 bags, Fusarium Solani, 10 per cent.
 „ 20.—Rosenberg, Cape Town, 15 bags, Fusarium Solani, 3½ per cent.
 „ 21.—Hersman Bros., Cape Town, 40 bags, Fusarium Solani, 4 per cent.
 „ 22.—Hersman Bros., Cape Town, 25 bags, Fusarium Solani, 3 per cent.
 „ 22.—Hersman Bros., Cape Town, 8 bags, Fusarium Solani, 1½ per cent.
 „ 22.—Kaplan Bros., Bot River, 10 bags, Fusarium Solani, 5 per cent.
 „ 24.—Rosenberg & Levitan, Cape Town, 25 bags, Fusarium Solani, 4 per cent.
 „ 24.—Rosenberg & Levitan, Cape Town, 14 bags, Fusarium Solani, 3½ per cent.
 „ 25.—J. Herama, Cape Town, 20 bags, Fusarium Solani, 1½ per cent.
 „ 28.—Harris Bros., Elgin, 15 bags, Fusarium Solani, 3 per cent.
 „ 29.—A. Warren, Toise River, 5 bags, Bacillus solanacearum, 25 per cent.

LEMONS.

- Dec. 4.—N. S. Samy, Grahamstown, 2 cases, Citrus Rot, 30 per cent.
 „ 7.—J. D. Smith, Kimberley, 2 cases, Red Scale, 40 per cent.
 „ 18.—Groot Drakenstein Wine Co., Simondium, 21 boxes, Citrus Rot, 50 per cent.
 „ 29.—J. H. T. de Villiers, Simondium, 8 cases, Red Scale, 22 per cent.

ORANGES.

- Dec. 14.—B. H. Davis, King William's Town, 8 casks, Citrus Rot, 4 per cent.
 „ 17.—J. Rosen & Co., King William's Town, 1 box, Red Scale, 36 per cent.; Citrus Rot, 9 per cent.

APRICOTS.

- Dec. 7.—Naidoo & Co., Wellington, 5 cases, Codling Moth, 2 per cent.; *Rhizopus nigricans*, 2 per cent.
 „ 7.—J. S. Naude & Co., Worcester, 20 cases, Codling Moth, 2 per cent.; *Rhizopus nigricans*, 20 per cent.
 „ 7.—Rhodes Fruit Farm, Wellington, 13 cases, Codling Moth, 2 per cent.
 „ 8.—Naidoo & Co., Wellington, 5 cases, Codling Moth, 1 per cent.; *Rhizopus nigricans*, 20 per cent.
 „ 8.—J. S. Naude & Co., Worcester, 20 cases, Codling Moth, 1 per cent.; *Rhizopus nigricans*, 20 per cent.
 „ 24.—R. S. Palachy, Wellington, 5 cases, Codling Moth, over 1 per cent.; *Rhizopus nigricans*, 15 per cent.

PEARS.

- Dec. 14.—M. J. Naik, Huguenot, 3 baskets, Codling Moth, 1½ per cent.
 „ 20.—D. J. Siebert, French Hoek, 10 cases, Codling Moth, 2 per cent.
 „ 21.—P. J. Retief, Huguenot, 5 baskets, Codling Moth, 1½ per cent.
 „ 22.—W. Kirk, Stellenbosch, 49 boxes, Codling Moth, 4 per cent.
 „ 22.—W. Kirk, Stellenbosch, 50 boxes, Codling Moth, 4 per cent.
 „ 22.—P. J. Retief, Huguenot, 4 baskets, Codling Moth, 3 per cent.
 „ 23.—C. D. Doode, Stellenbosch, 1 box, Codling Moth, 12 per cent.
 „ 24.—S. Cotzias, Somerset West, 9 baskets, Codling Moth, 3½ per cent.

TABULATED SUMMARY OF CAPE PRODUCE REJECTED BY THE TRANSVAAL ON ACCOUNT OF THE ACCOMPANYING PESTS.

Article.	Disease.	Extent to which infected by Sample examined.										Sorted.		Destroyed.		Re-con- signed.		Total Rejected.	
		1 %		1 % to 2 %		2 % to 5 %		5 % to 10 %		Above 10 %									
		Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.	Con- sign- ments.	Pack- ages. ments.		
November, Potatoes	1909. Earworm Fusarium Solani Bacterial Disease	...	...	...	...	1	40	...	...	...	...	1	40	...	...	...	...	1	40
		...	...	...	...	4	141	...	...	...	...	6	168	...	...	...	...	9	204
Oranges	Citrus Rot	...	...	...	...	2	26	...	...	...	...	...	...	...	...	...	...	3	28
	Red Scale	...	...	...	...	2	44	...	...	...	...	...	...	...	...	...	...	3	67
Lemons...	Citrus Rot	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
	Red Scale	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
	Citrus Rot	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	66
	Red Scale	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	68
Total for	November, 1909	...	...	...	...	9	251	6	113	7	110	7	208	3	3	12	263	22	474
December, Potatoes	1909. Fusarium Solani Bacillus	...	...	2	28	11	213	1	27	...	...	14	268	...	...	...	...	14	268
	Solomacearum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	5
Lemons...	Citrus Rot	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	23
	Red Scale	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	10
Oranges	Citrus Rot	...	...	...	...	1	8	1	1	...	...	...	...	...	...	...	...	2	9
	Red Scale	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	9
Apricots	Codling Moth...	2	25	4	43	...	...	...	...	...	...	...	...	5	55	1	13	6	68
	Rhizopus	2†	25†	4†	30†	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Nigricans	...	...	3	18	4	112	...	...	...	...	...	...	1	1	7	130	8	131
Pears ...	Codling Moth ...	...	...	...	...	...	...	...	...	...	...	...	...	8	8	...	...	...	...
Total for	December, 1909	2	25	9	89	16	333	2	28	6	39	14	268	8	59	13	187	35	514

* Also listed under Citrus Rot, and therefore not included in total. † Also listed under Codling Moth, and therefore not included in total.

CORRESPONDENCE.

Sick Ostrich Chicks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have a sickness amongst my ostrich chicks which generally ends with death, and the cause of which I don't know, nor the remedy. Now, I want to ask you if you ever came across it, and if so, let me know all about it. It generally affects the chicks when they are a week to fourteen days' old. Their heads hang down, the chicks stagger about, and are unable to lift up their heads themselves. If you lift it up for them they can walk about again, and look quite fresh, but as soon as they want to feed, down the head goes, and they can't lift it up again. I lost a good lot lately. I would be much obliged to you for a remedy. I opened some chicks, but could only see that the lungs have a yellowish colour. As to their feed, I put them on a new and separate piece of lucerne. Perhaps some of the readers of the *Agricultural Journal* have had the same sickness.—Yours, etc.,

PERCY KLEUDGEN.

Hops River, P.O. Miller, January 11.

It is difficult from the description to say exactly what this trouble may arise from, as such symptoms might be the result of several causes. Errors of food or management, accident or injury or even the consumption of some injurious plant might be responsible. The only advice that can be offered is to keep all chicks and young birds under careful supervision and thus endeavour to find the cause. As it is possible that some of our readers may recognise the trouble we would be glad of information for the guidance of others.

Snakes and Ostriches.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I contemplate going in for ostrich farming in this district, but find that in a good many instances turkey hens sitting on eggs have been bitten and killed by some species of poisonous snake. The idea has presented itself to me that ostrich hens sitting on eggs might share the same fate, and I shall be much obliged if you could, through the medium of your *Journal*, ascertain from ostrich farmers in your Colony, whether such a danger is likely to threaten my venture. Thanking you in anticipation,—Yours, etc.,

T. KLEINENBERG.

Pietersburg, Transvaal. December 8.

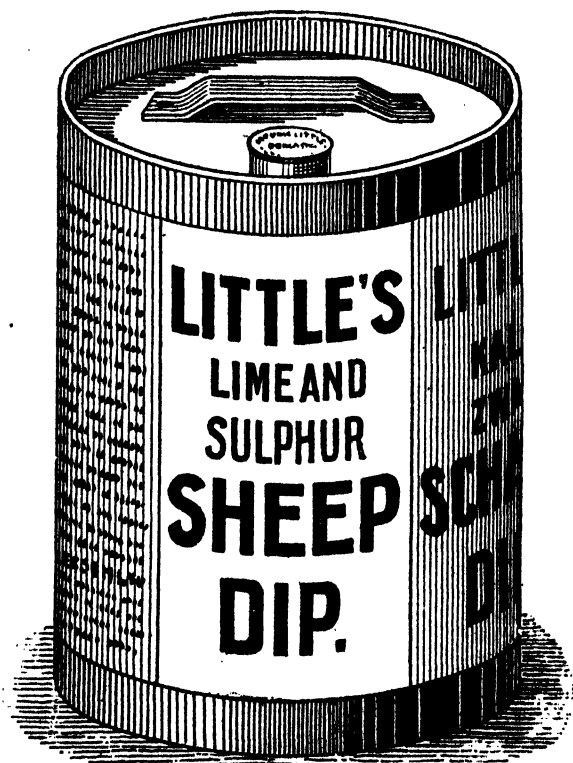
Storing Ostrich Eggs for Incubation.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In your *Journal* of April, 1908, a return of egg-laying record of ostriches was given by Mr. E. H. Gibbons. I noticed that Mr. Gibbons collected these eggs daily until he had accumulated about thirty, when they were placed in an incubator. In June last year I purchased a grand pair of birds from Mr. A. H. Turner, "Krom Bek" strain, four years old. These birds were put in an old land which has a large willow tree, and in the shade of this tree they made their nest. I wanted to get a good number of eggs, so I adopted Mr. Gibbons' plan, and removed the eggs to my store-room. The birds were very well fed on green food as well as grain.

Some of my friends consider that removing the eggs is the cause of such a bad result and so many rotten. The eggs were bound to be fertile, as egg No. 2 contained a small dead chick. For the information of myself and others who have made large investments in grand birds, I shall be glad to hear through the medium of your

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paper what you or your readers may consider the cause of such a result. If more information is required, such as state of weather on day of each egg, etc., I shall gladly give a record of same. I should like to know what Mr. Gibbons did with the eggs until he obtained the required number. Thanking you in anticipation.—Yours, etc.,

J. G. WEBSTER.

Waylands, Ann's Villa, January 3.

RECORD OF EGGS.

No. of Egg	Date laid.	No. of days stored in house.	Result of Eggs.	How taken to Incubator.	Remarks.
1	Oct. 7	1—8 were stored 11 days.	Infertile	From 1 to 15 were taken in a spider. by a careful driver to Russell Park. Incubator 7 miles from Waylands.	Eggs 1—8 remained in the nest until No. 9 was laid. The room was well ventilated, dry and cool. Eggs were turned regularly once a day. The chicks started hatching four days before the six weeks, and ended just a day before the time.
2	" 9		Small dead chick		
3	" 11		Rotten		
4	" 13		"		
5	" 15		"		
6	" 17		"		
7	" 19		Hatched		
8	" 21	10 days	"		
9	" 23		Large dead chick		
10	" 25		Hatched		
11	" 27		"		
12	" 29		"		
13	" 31		"		
14	Nov. 2		"		
15	" 4	2	Large dead chick		
16	" 7	6	Rotten	16 carried by a native.	

This cock had two hens. The one never laid although paired with. This hen used to go to the nest regularly, every second day, for hours at a time.

Removal of eggs from the nest does not affect them provided ordinary care is exercised in storing. It would be interesting to know the weather conditions that prevailed, especially if there were any thunderstorms. Another vital point is the temperature maintained in the incubator.—Ed., *Agricultural Journal*.

Eelworm in Lucerne (*Tylenchus*).

To the Editor, AGRICULTURAL JOURNAL.

SIR,—As we are again blessed with the misfortune of an additional pest, viz., eelworms in lucerne, and as there seems to be no remedy once it is established, our attention naturally must be limited to, and concentrated upon, prevention.

I should therefore suggest that before sowing, the seed should be well soaked in a mixture of bluestone and water. It was the practice of my father and many old people, to treat oats in that way, with a view to destroying undesirable constituents. The oats, so far as I am aware, were never damaged, and I think we can expect the same results by subjecting lucerne seed to the same treatment. We generally find March and April the best time to sow our lucerne here. I hope then to experiment with the above, and shall report to you as early as possible. In the meantime, however, will not some of our brother lucerne growers who are about to sow, experiment and see if any damage is done to the seed and if the parasites are killed.—Yours, etc.,

P. RITCHIE.

Modder River, January 5.

Our correspondent is referred to the article in another part of the current issue on the above subject. We may add, for general information, that the bluestone treatment has been tried, and failed. In experiments conducted by this Department it was found that while the bluestone seriously injured the germ of the seed the eelworm was not noticeably affected.—Ed., *Agricultural Journal*.

Certain Death to Moles.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the December number of the *Journal* a correspondent complains of moles in his garden. The following receipt is certain death to the moles: Take a small piece of sweet potato, about the size of a shilling, and make several cuts in it. Then take a large grain of strychnine, powder it, and put a little of the powder into each cut, being careful to close the cut again to prevent the powder falling out. It is much better to make several cuts and distribute the powder in the bait, as being very bitter, the mole will eat round the poison if put all in one place. Feel for the runs with a dibble, and drop a piece of bait into each run, and leave the holes open. Do not touch the hills. The result of this treatment is one bait—one dead mole.—Yours, etc.,

G.S.L.

Winburg, O.R.C.

The Clarification of Honey.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the November issue of the *Journal* Mr. Herbert Carter, of Ashton, asks for a "method whereby honey can be clarified," and subjoined is a reply by Mr. Attridge, who says there is no process known to him for that purpose. Maybe Mr. Carter would like to try the following, which I gladly give, and will be very successful for the purpose. It is clean, quick, causes no deterioration in colour, taste, or aroma. Method: Take 25 lb. honey, dilute with half this weight of water, and boil over a gentle fire, with a paste obtained by twirling three sheets of white blotting paper with water until the paper is reduced to very fine fibres. The mixture is allowed to cool, and then put into a woollen straining bag previously moistened. The honey runs off as clear as wine, and when the remaining paper pulp is washed out, the dark yellow wine-coloured fluid is evaporated to the required consistency in a vapour bath.—Yours etc.,

"ICHNEUMON."

January 17, 1910.

A Destructive Beetle.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I note in your issue for the current month, Mr. S. Meaker, of Daggaboers Hoek, asks for some method of destroying the yellow-spotted beetle that infests potatoes. When first I arrived at this place my potatoes were destroyed in a similar manner. The means by which I got rid of the beetle was in the early morning to go in with an empty paraffin tin and shake the tops on which the beetles lodged into the tin, and when it was about half full, destroy them by pouring boiling water on them or in some other manner. The second season they were not half so numerous, but since then I have not been troubled with them. In the early morning they are unable to fly, and a couple of boys in half an hour can collect vast quantities. I may state that I am very careful to burn all potato haulms after the crop has been gathered, as I have no doubt they are infested with eggs.—Yours, etc.,

OBSERVER.

Fort Beaufort, January 31, 1910.

Circular Dipping Tanks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In your January issue I notice a recommendation of Mr. Albert E. Bateson. of circular dipping tanks with a pillar in the centre. Eighteen years ago I had the first dipping tank built in the district of Molteno in the manner as recommended by Mr. Bateson. Having completed my tank I made a trial, but found that the pillar in the centre was so fatiguing to the stock that, after having dipped for half a day I ordered the natives to break it out and remove it. For these reasons: If

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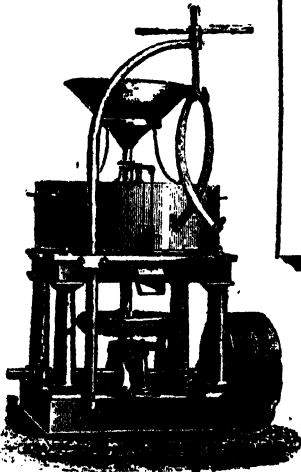


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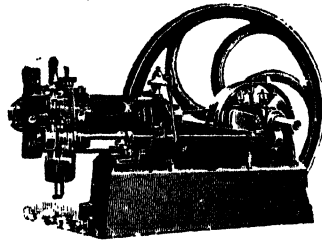
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CORN MILLS



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January 29th, 1910.

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Engineers, Cape Town.

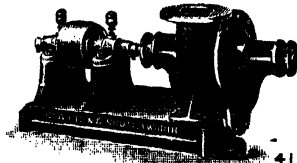
DEAR SIRS,

We have much pleasure in stating that the "Crossley's Oil Engine" and "Pearn Treble Ram Pump" which were supplied to us by your firm were tested yesterday by Mr Stainthorpe, the engineer for the works and representing the Government, and the whole plant did the work required of it most satisfactory. The Engine was run at 263 revolutions per minute and the Pump at 75 revolutions per minute and on a 5 hours test they pumped into the reservoir more than the specified quantity, which is 6,000 gallons per hour. The Engineer and Village Management Board and ourselves are well satisfied with the result of the test.

We would take this opportunity to thank you for the care and promptitude with which you supplied this machinery to us and owing to the secure way in which it was packed we received it without any breakage although it was brought over 100 miles on an Ox Wagon over very rough roads.

Yours faithfully,

(Sgd.) HOPE & BELL,
Contractors.



418 A

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GEO. FINDLAY & CO., CAPE TOWN.

your dipping tank is 25 feet in circumference—which is 8 feet diameter—and the animal has covered a distance of 75 feet, it is so tired out, in case of a long-wooled sheep, as to require assistance from an extra man at the outlet. Besides, merino sheep should be harassed as little as possible, for that affects the condition of the animal in such a way that it suffers from it either immediately or afterwards. In the circular tank without a pillar one may put from six, eight, to ten sheep at a time, and they have sufficient space to move about that any kind of dip will penetrate in such a way that, after two to four minutes, according to the length of the wool, the sheep are so well dipped, without being tired, that it is quite unnecessary to put the burden on them of being forced to swim. I further admit the quality of perfection of a circular dipping tank, whether such be denied by the best of sheep inspectors of this Colony, or by any practical farmer. On account of the disadvantage of the fatigue, I would advise any farmer not to have a pillar built in the centre. I say this, that if the Government had caused the farmers, some fifteen or twenty years ago, to build circular dipping tanks, I guarantee that scab would have been suppressed to a greater extent than is the case at present. For this kind of tank itself works in such a thorough manner that by keeping the sheep in it for from two to four minutes, the scab is soaked thoroughly, without the sheep getting tired; and not only the insect is drowned, but the eggs are also affected in such a manner that they take more time to hatch. On recommending it to the Government at the time the answer was that, although the suggestion was a practical one, the dipping tank was too expensive to be erected by the Government; and I maintain, as a stockfarmer, that unless every farmer has such a tank on his farm and does thorough work, we will be sufferers and slaves of scab so much longer. Unless a farmer should have a long tank of 30 feet and more—which will be a great loss with regard to the quantity of dipping material, I will guarantee him that he cannot dip better than I and others who happen to have circular tanks, and who with from two to three assistants will do quicker and better work than those with long tanks. Not for money do I want to have a long tank on any property of mine, and I think that will be the opinion of any progressive farmer, whether English or Dutch. I only want to say in conclusion: Stockfarmers, take your time, instead of two minutes, take four, and do your work thoroughly; repeating the dipping on or about the ninth or tenth day, and you will prevent the unnecessary loss in wool and animals, especially your valuable merino sheep; and clean your "legplekken," kraals, etc., as is most convenient, both by fencing the legplekken and kralen and removing periodically the manure and burning it.—Yours, etc.,

S. A. CLOETE.

Haasjesfontein, Molteno, February 1.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

Lad, aged 20, tall, strong, healthy, well-educated and *willing to work*, is anxious to be taken on as pupil to a practical stock farmer. Good references as to character etc. Reply to Mrs. MYLES PARKER, 38, Bok Street, Joubert Park, Johannesburg.

Young Colonial, age 21, desires position as manager or sub-manager on good farm; has had five years good training in all-round farming; good references; health excellent. Apply A. J. S. DE VILLIERS, c/o J. D. DE VILLIERS, Ailsa Craig, Bellevue Street, Cape Town.

*Colonial, 24 years of age, desires employment as Manager or Assistant on farm. Has had about three years' experience in mixed farming, cattle, horses, sheep, grain, &c. Thorough knowledge of dairy work, including hand-rearing of calves. Good references. Free April.—"G." Monorgan, Newlands, Cape.

*Wanted, a young man willing to learn farming on mixed Stook farm. Must pay for his board. Or gentleman wishing to recruit his health on an up-country farm, close to town and Railway Siding.—Apply to H.B., Pretorius Kloof Siding, Graaff-Reinet.

*Wanted positions by two Canadian Butter and Cheesemakers; have had eight and ten years' experience. Graduates of Kingston Dairy School, Kingston, Ont., Canada; also University State Dairy of California, U.S.A. At present holding Manager's position in creamery. Can furnish good references from past and present employers. Would be willing of coming to South Africa if similar position would be offered.—Address, Allen G. Roe, Gustine, California, U.S.A.

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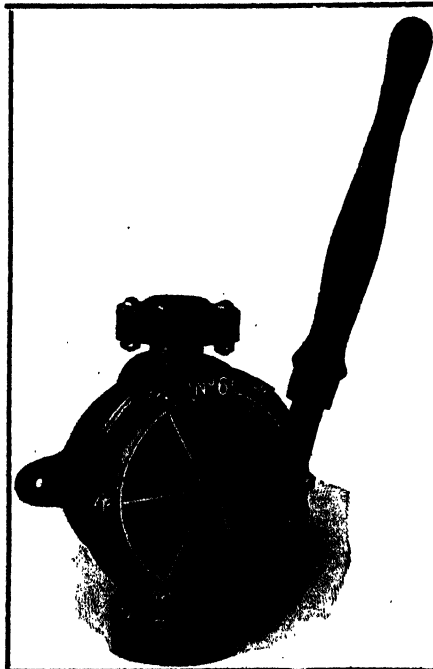
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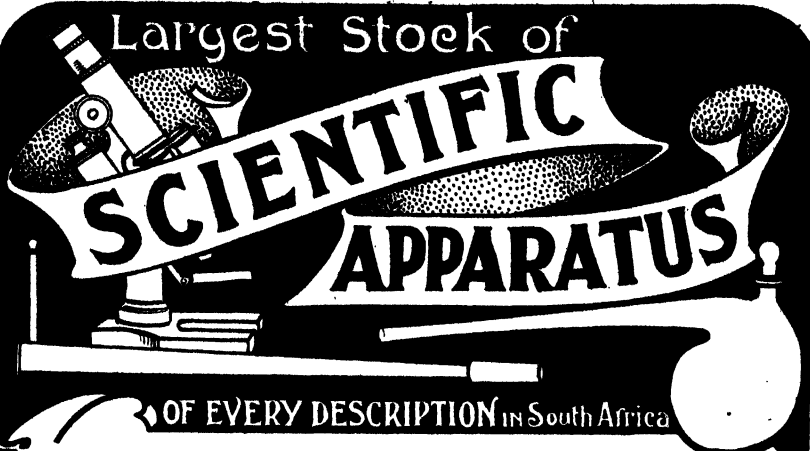
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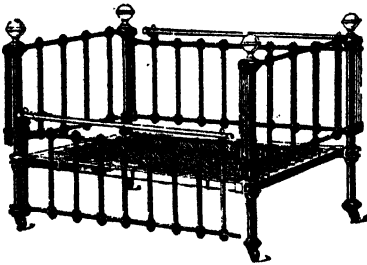
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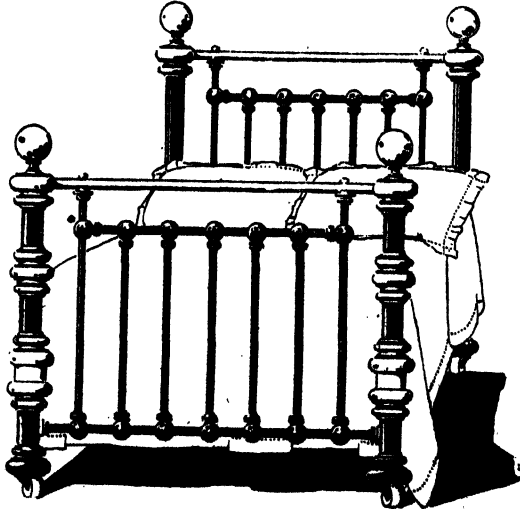
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NOTES ON THE WEATHER OF DECEMBER, 1909.

By CHARLES M. STEWART, B.Sc., Secretary to the Meteorological Commission.

A mean pressure slightly less than usual, exceptionally cold days and nights for the season of the year, a high percentage of cloud, with fairly frequent fogs and mists; thunderstorms somewhat less frequent than usual, but of great intensity, causing the loss of several lives as well as killing cattle, etc.; some destructive hailstorms: an unusual excess of Westerly winds; a large excess of precipitation, particularly in the West and South, with some cold rains and some strong winds; these were the main characteristics of the weather of December, 1909.

DIVISION.	Mean Rainfall (1909). Inches.	Mean No. of Days.	Average Rainfall (1891- 1900). Inches.	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
Cape Peninsula ...	4.49	13	1.24	4	+3.25	+262
South-West ...	2.60	8	0.79	3	+1.81	+229
West Coast ...	0.75	4	0.27	1	+0.48	+178
South Coast ...	5.17	13	1.93	7	+3.24	+168
Southern Karoo ...	2.10	5	0.51	2	+1.59	+312
West Central Karoo ...	2.29	5	0.87	3	+1.42	+163
East Central Karoo ...	1.91	8	1.90	5	+0.01	...
Northern Karoo ...	1.90	7	1.65	4	+0.25	+ 15
Northern Border ...	1.40	4	2.04	5	-0.64	- 31
South-East ...	4.13	12	3.48	9	+0.65	+ 19
North-East ...	3.97	10	3.75	8	+0.22	+ 6
Kaffraria ...	5.08	14	4.36	11	+0.72	+ 16
Basutoland ...	6.36	15	5.20	12	+1.16	+ 22
Durban (Natal) ...	8.07	21	5.12	...	+2.95	+ 58
Bechuanaland ...	4.29	9	3.93	8	+0.36	+ 9
Rhodesia ...	7.49	20	5.88	12	+1.61	+ 27

Precipitation, on the mean of 379 stations, amounted to 3.49 ins., falling on 9 days, being 1.33 ins. or almost 62 per cent., in excess of the normal. This mean is 1.83 ins. above that for December, 1908, and 2.05 ins. more than that for the preceding month, or, in other words, is considerably more than double the mean amounts registered during these months. A glance at the accompanying tabular statement shows that the divisional means were above the average in all cases except the Northern Border, where the amount was about one-third less than usual. The excesses were particularly large in the West and South, ranging from 163 per cent. over the West Central Karoo to 312 per cent. over the Southern Karoo. In the North and East the surplus was much smaller, varying from 6 per cent. over the North-East to 58 per cent. at Durban (Natal). In all cases the sectional means were largely in excess of those registered during either November last or December of the previous year. An examination of the individual returns shows that of the 379 stations, only 2 in the Northern Border reported "Nil;" and only 11 (ten being in the West Coast Division) had totals between 0.01 in. and 0.50 ins. Of the remainder 15 had 0.51—1.00 ins., 75 each had 1.01—2 ins. and 2.01—3 ins., 72 had 3.01—4 ins., 50 had 4.01—5 ins., 36 had 5.01—6 ins., 12 had 6.01—7 ins., 14 had 7.01—8 ins., 9 had 8.01—9 ins., 3 had 9.01—10 ins., leaving

five (5) with quantities exceeding 10 inches, viz., Blaauwkrantz, 10·07 ins.; Witte-El's Bosch, 10·17 ins.; Harkerville, 10·26 ins.; Edinburgh (Div. Knysna), 10·37 ins., all in the South Coast Division, whilst the largest total of 12·23 ins. was registered at Evelyn Valley. The maximum falls in 24 hours were also heavy at a number of stations. Of 374 only 66 had "Nil" to 0·50 in., 138 had 0·51—1·00 ins., 134 had 1·01—2·00 ins., 27 had 2·01—3 ins., 6 had 3·01—4 ins., and three (3) exceeded 4 ins.—Harkerville, 4·45 ins.; George (Plantation), 4·75 ins.; and Woodfield, 5·22 ins., all on the 26th. The "Christmas rains" were unusually heavy over the South-West and South, and were accompanied by exceptionally cold weather, lasting practically from the 24th to 30th with a break on Christmas Day. Owing to the cold wind and rain during this period a number of small stock, ostriches and goats, are reported to have perished at Rietfontein (Division Willowmore) and at Somerset East, and at Plettenberg Bay a large quantity of forage wheat has been washed away or rotting. The rains of this month, although abundant at most stations, were too late to be of much benefit to agriculture, particularly in the East, where the crops are reported as likely to be considerably below those of last year, and at Mount Ayilf natives are stated to be purchasing grain at £1 a bag for mealies. The prospects for the season are, however, reported to be excellent in Bechuanaland. *Thunderstorms*, although less numerous than in December of last year, appear to have been much more severe, causing considerable loss of life and damage at several stations. Thus on the 11th at Herschel Constable G. Dunna was killed and two native children injured, and a sheep and cow killed; two huts were burned, and the lightning is known to have struck nine places in the vicinity. On the 16th, at the same place, a native herd was killed. At Kokstad on the 15th a tree was struck on the Market Square and a native woman killed in the district. In all, 494 of these storms were reported as occurring on the 31 days of the month, most widely on the 1st, 11th to 14th, 18th to 20th, and 22nd to 23rd. *Hail* fell at 23 stations on 10 days, principally on 1st, 14th, and 23rd. The hailstones in a number of cases were of considerable size, causing damage to property, etc. Thus at Lemoenfontein on the 13th their average size is reported to have been as large as golf balls, the stones perforating iron roofing and causing much damage to the veld. On the 16th at Herschel the hail caused extensive damage to gardens and crops. At Sterkspruit on 1st the hail was of the size of pigeon's eggs, and was unmelted in shade 24 hours' afterwards; and on 16th occurred three hailstorms of 10 minutes' duration within 40 minutes; cattle, sheep and goats were drowned. 12 in the immediate neighbourhood, and about 700 in the district. At Matopo Park (Rhodesia) considerable damage was caused to trees, etc., by a very heavy hailstorm on 9th. No *Snow* or *Sleet* reported.

Temperature, Cloud and Wind.—The mean temperature of all stations was 65·7°, being only 1·0° warmer than during the previous month, and 3·1° lower than December of 1908. The mean maximum (75·9°) is actually 0·4° lower than during November, and 4·4° lower than the previous December, so that the increase in the mean monthly temperature over the preceding month was entirely due to the mean of the night temperatures (55·6°), being 2·4° higher, although it was 1·6° lower than in December of the previous year. As a matter of fact the mean temperatures for this month at stations in the Cape Peninsula, the West and South-West, as well as over a considerable portion of the stations along the South Coast and in Southern Karoo were below those for November mainly by about 1 to 4 degrees, the differences being greatest over the Cape Peninsula. Compared with the normal values, the mean monthly temperature is 1·8° less than usual, the day temperature being 2·5° and the night temperature 1·1° below the corresponding averages, making mean daily range 1·4° less than the normal. At the individual stations the means for the month were considerably lower than usual by amounts ranging from 5·8° at Devil's Peak (Cape Peninsula) to 0·1° at Port Nolloth. The only exceptions were Queenstown, Kokstad, Umtata and Hopefontein, where there was an excess of 1—2·5 degrees, although the deficits at some stations in the East were only a few tenths of a degree. The deficits in the day temperatures were enormous in many instances, being 3—7 degrees in the Cape Peninsula and South-West, 1—3 degrees along the South Coast and inland for a considerable distance, but decreasing to a few tenths of a degree in the East; the largest deficiency was 8·4° at Amalienstein. At Port Nolloth, Aliwal North, Queenstown, Kokstad and Hopefontein, however, the mean day temperatures were in excess, by amounts ranging from 0·6° to 2·4°. Similarly the mean night temperatures were much lower than usual, by 2—5 degrees in the South-West, some stations in the South and interior, although in many instances the deficit decreased to less than a degree at stations near the South Coast and in the East of the Colony. At a few stations in the South-East and in Kaffraria generally there were small excesses of a few tenths, increasing to 2·0° at Hopefontein. The mean warmest station was Mochudi (76·8°) and the mean coolest Disa Head (Table Mountain) with 53·3°, a difference of 23·5°. The highest mean maximum of 80·6° belongs to Mochudi, and the lowest mean maximum of 47·4° to Disa Head. The extreme maxima for the month were registered on 17 days, 1st, 5th, 6th, 8th to 12th, 17th to 23rd, 28th and 29th, chiefly on 18th; the extreme minima were recorded on 14 days, 5th to 10th, 18th, 22nd, 24th to 26th, and 28th to 31st, principally

on the 31st, in the East and North, and between 6th and 8th in the West and South. The mean value of the highest readings (89.7°) was exceptionally low, being 4.4° under the corresponding value for the previous month and for December, 1908. The mean of the lowest readings (46.5°) is 2.2° higher than the value for November last, but 3.1° lower than that for the previous December. The mean monthly range, 43.2° , is 6.6° less than in November last, and 1.3° less than in December of 1908. The only instance of the maximum reaching a temperature of 100° was on the 6th at Mochudi, while the extreme minimum for the month, 39.0° on the 22nd at Umtata, was the only instance of the lowest reading falling below 40° . The extreme monthly range over all stations was, therefore, 61.0° . No instance of *Frost* was reported during the month. At Retreat (Cape Peninsula) the mean value of the grass minimum was 51.3° or 5.1° lower than the shade minimum, ranging from 38.8° on 8th to 60.1° on 12th. A reading of 39.7° on the 24th was the only other instance of this thermometer falling below 40° F.

The unusually low temperatures of the month makes it not at all surprising that the mean proportion of *Cloud* should be unusually high, amounting to 53 per cent., or 6 per cent. more than last month, and 11 per cent. in excess of the mean for December, 1908. The sky was most obscured in the West, South, South-East and Kaffraria, the mean cloudiness ranging from 62 per cent. over the Cape Peninsula, decreasing eastward to 52 per cent. over the South-East, and rising to 58 per cent. in Kaffraria. Inland it was mostly about 35 per cent., but increased to 40 per cent. at Hopefountain. The cloudiest stations were Table Mountain and Port St. John's, with means of 76 per cent., whilst the clearest skies were experienced at Mochudi, where the proportion was only 25 per cent. *Fogs* and *Mists* were slightly more numerous than in November or the previous December, 137 instances being noted during the month, most numerously on 25th, 26th, and 10th. The prevalent *Wind-Directions* were Southerly, S.E. to S.W. in the West and South-West, Westerly along the South Coast to Port St. John's, and for some distance inland, South-Westerly at Durban. In the interior they were mainly Westerly (N.W. to S.W.), but North-Easterly at Teyateyaneng, Mochudi, Southerly at Kuruman, and South-East at Hopefountain, Bedford, and East at Main and Amalienstein. The mean *Force* of the morning winds on the Beaufort Scale was 2.10, corresponding to a velocity of 13.5 miles per hour, being slightly in excess of the mean velocities for November and December previous. The winds were strongest over the South-West, and weakest over the Southern Karoo. A closer examination of the records of direction shows that at many stations in the West and East the Northerly and Southerly winds were almost of equal frequency. At the Royal Observatory there was a marked decrease of true South and S.E. winds, amounting to about 26.5 per cent. but an increase of these from S.E., S.S.W., and S.W., although the most frequent individual direction was N.W., which amounted to 26 per cent. of the whole. The mean velocity there was 15.8 miles per hour, or 0.9 miles per hour more than usual. The number of *Gales* reported was about half as many again as in December, 1908, and slightly more than in November; in all 37 instances of the wind attaining this force being noted on 14 days, principally 5th, 19th and 30th. Two *Duststorms* were noted, one on 18th, and the other on 27th. *Hot Winds* were reported from Slaate on 9th, Kokstad on 8th, 9th, 12th, and Bedford and Stutterheim on 29th, six instances in all.

An *Earthquake Shock* was felt at Blaauwberg on 9th at 4.22 p.m., and at Groot Drakenstein on the same date at 7.20 p.m.

The mean pressure at the Royal Observatory was 29.98 ins., or 0.01 ins. less than usual.

OBSERVERS' NOTES.

VRUCHTBAAR (Wellington).—An exceptionally cool December, with nights so cool that it looks more like August than our usual December heat. The cool weather hampers the fruit drying, of which apricots is in its full swing now very much, and the output will be very much below the average.

CONCORDIA (Krapohl).—In North of Division harvest poor; in South, fair.

FORMOSA (Plettenberg Bay).—Veld looking grand. Harvesting operations hindered. Large quantity of forage and wheat washed away, and where not washed away, rotting.

LEMOENFONTEIN (Beaufort West).—Terrific hailstorm on 13th; average size of stones as large as golf balls; made holes in corrugated iron roofing and much damage to veld.

RIETFONTEIN (Willowmore).—On account of the cold South wind on the 26th many goats and ostriches perished.

KLIFFONTEIN (Graaff-Reinet).—Generally the rainfall has been most disappointing for December.

RYEDALE (Aberdeen).—Total rainfall for 1909, 11·36 ins.; rather above the average, but mostly fell in May; last six months were very dry and drought serious. Bult River quite dry for eight months.

SOMERSET EAST.—During the five days (23rd to 27th) a good many small stock died on account of the very cold rains.

TORGEDACHT (Jansenville).—Total rainfall for 1909 is 11·19 ins. as compared with 3·66 ins. for 1908.

THEEFONTEIN (Hanover).—Rain spread over 6 days; will not go far to break up drought. Veld eager to grow, but not sufficient moisture. Splendid South-Easter blew on Christmas Day; great show for rain, but only half an inch fell. Cold, unseasonable weather last week of month. Winds mainly Westerly. Drought unbroken.

HUXLEY FARM (Stutterheim).—A very poor season for crops. Mealies very late; a few early ones badly eaten with grubs. In spite of 2½ inches more rain than the previous year, the mealie crops won't be anywhere near last year's. Live stock has done very well, and fever amongst sheep has not as yet turned up. Rainfall for the year, 25·07 inches.

HERSCHEL.—On the 11th heavy rain, thunder and lightning severe. Constable G. Dunna killed, two native children injured. One sheep and one cow killed. Two huts burnt. Lightning known to have struck nine places in vicinity. On the 16th very heavy thunderstorms with hail; lightning very severe; native herd killed. Extensive damage to gardens and crops.

LAURISTON (Barkly East).—Immense swarms of locusts passed through the district this month, travelling North, accompanied by thousands of storks. The locusts did a great deal of damage to crops.

STERKSPRUIT (Herschel).—On the 1st very heavy rain, much wind and lightning. Hail the size of pigeon's eggs. Hail thawed in shade 24 hours afterwards. On the 16th exceptionally heavy hailstorms. Three of ten minutes' duration within 40 minutes. Cattle, sheep, and goats drowned; 12 in immediate neighbourhood, about 700 in district.

SUNNYMEADE (Albert).—Weather this month has been very promising. Parts round about have had good rains.

ARMADILLO CREEK (Vryburg).—Clouds come up daily, but winds are contrary. The N.N.W. winds of last year are absent; it is now too much west. It never rains, but it pours. In previous six months only one inch fell (December rainfall 5·89 ins.). Dams now all full. Thousands of native ploughs scratching the mealies. Horse sickness feared; mosquitoes rampant.

NOTTINGHAME (Mafeking).—Country green and very fresh. Prospect for season, excellent.

MATOPF PARK (Rhodesia).—Very heavy hailstorm on the 9th with much rain. Considerable damage done to trees, etc.

KOKSTAD.—Thunder shower on 15th, lightning most severe. Tree struck on Market Square, and a native woman killed in district. Rivers still running high. Veld in good condition. Lightning very vivid and dangerous.

GROOT DRAKENSTEIN.—A most exceptional month in every way. The weather was very cool except for a short spell from the 11th to the 19th. The rainfall was the heaviest ever experienced in December during 17 years, and about double the previous record for the month. There were several fairly strong gales, which did considerable damage to the fruit crop. A slight earthquake shock was felt on the 9th at 7.20 p.m. On this farm only a loud rumbling was noticed, but other people state that their houses were shaken. The temperature was 2·7° below that of last month (November). Mean temperature of month, 4·3° below the average of 10 years; mean maximum, 7·3° below the average of 10 years; rainfall, 3·05 ins. above the average (0·96 ins.); mean temperature for year (1909), was 62·9°, which is 0·3° above the average of 10 years. The rainfall (1909) was 33·83 ins., which is 1·47 ins. less than the average of 16 years.

MOUNT AYLIFF.—Owing to the lateness of the rains and their insufficiency, there is every prospect of a most serious failure of crops this season. Natives are already buying grain at as much as £1 per bag of mealies. As a rough estimate in this district, not one-fifth of the usual amount of ground is under cultivation. It is now thirteen days since the last rains, and in this part of the country, owing to the shallowness of soil and the rapidity with which water runs off, even a week's drought is a serious matter. This is a matter which might well engage the attention of the Government.

KOKSTAD (Coyte).—A good, general rain fell during Christmas time, otherwise rain has not been too abundant. The total rainfall for the year, 31·38 ins., and the average for five years (1905-9), 31·13 ins. The year has been a good one for farmers, whose outlook is very cheerful.

CARNARVON FARM.—1909 closes with 3·08 for December, or nearly an inch above the last 9 years' average. Had there not been a meteorological return of *nulla bona* for June, July and August, we should have had one of the most prosperous years on record, instead of one of the worst. No "dry farming" can stand 90 days on end without a drop of rain. Wind is considerably below the average for December. Frost: Only on five occasions has frost been recorded in the last nine years, and only three cloudless days. It has been an unprecedentedly good year for stock. No cattle have died from poverty, and practically no small stock. Mealie crop will be a partial success. Four times the quantity would have been sown had good rains fallen earlier. Locusts have not done much damage. Birds and "spray" have "done for" all that hatched south of Orange River. None seen for last month. They were fairly driven out of the country at the point of the beak or bayonet of the large white locust birds. Being end of year, I give a few statistics since 1901.

METEOROLOGICAL SUMMARIES FROM 1901 TO 1909.

Year.	Rain.	Wind.	Frost.	No clouds	Rainy days
1901	23·80	114	93	27	82
1902	13·56	112	89	18	57
1903	12·63	148	63	24	56
1904	17·85	145	108	39	71
1905	23·68	99	80	15	87
1906	21·18	96	98	42	90
1907	15·91	104	94	31	89
1908	12·22	144	106	20	59
1909	26·26	122	106	25	91
Totals	16·709	1084	837	241	681
Means	18·56	120½	93	26½	75½

Total rain since 1901	167·09
Average for 9 years	18·56"
Total wind 9 years	1084
Average for year	120½
Frost for 9 years	837
Average for year	93
No cloud for 9 years	241
Average for year	26½
Rainy days of last 9 years	681
Average for year	75½

December.	Rain.	Wind.	Frost.	No clouds.
1901	260	11	2	0
1902	139	2	0	0
1903	56	6	1	0
1904	240	11	0	2
1905	264	9	1	1
1906	401	9	0	0
1907	182	8	1	0
1908	159	5	0	0
1909	308	11	1	0
	2009	72	6	3
Means	223	8		

Total for 1909, 26·26.

STATIONS.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ...	71.1	56.8	64.0	90.8	18	45.7	8
Cape Town (S.A.O.) ...	72.7	57.1	64.9	96.0	18	47.5	8
Table Mountain (Disa Head)	59.2	47.4	53.3	81.0	18	41.0	6
Do. (Devil's Peak)	65.1	49.7	57.4	86.0	18	40.0	25
Blaawberg ...	68.1	56.0	62.0	80.0	18	49.7	7
Wynberg ...	72.4	53.7	63.0	87.5	18	46.8	6
Retreat ...	70.5	56.4	63.4	82.2	18	45.4	8
Grot Constantia ...	69.5	56.3	62.9	86.0	18	47.0	7
Danger Point ...	68.6	56.7	62.6	90.0	21	50.0	25
Elsenberg (Agri. College) ...	73.1	54.6	63.8	93.7	18	43.9	7
Robertson Plantation ...	79.0	55.9	67.4	97.0	18	48.0	7
Groot Drakenstein ...	75.0	55.9	65.4	98.2	18	45.3	8
Port Nolloth ...	66.2	51.6	58.9	73.0	17	46.5	7
O'keip ...	79.7	55.2	67.4	96.0	11	42.0	25
Malmesbury ...	79.8	54.8	67.3	97.0	18	47.0	7
Heidelberg ...	79.1	57.4	68.2	91.0	18	47.0	8
George (Plantation) ...	70.7	54.2	62.4	80.0	5	18.0	25
Cape Agulhas ...	69.6	58.1	63.8	73.0	20	51.0	7 & 8
Storms' River ...	70.5	54.5	62.5	85.4	18	48.0	25
Mossel Bay ...	71.8	60.9	66.4	85.0	5	52.0	7
Dunbrody ...	88.8	54.9	69.4	98.6	29	46.0	6
Cape St. Francis ...	69.8	59.0	64.4	74.0	5	53.0	8 & 9
Uitenhage ...	79.9	57.4	68.6	93.0	5	18.5	9
Port Elizabeth ...	73.1	59.1	66.1	85.0	5	51.0	25, 30 & 31
Amalienstein ...	80.2	54.6	67.4	95.0	18	45.0	26
Hanover ...	82.3	49.1	65.7	92.0	10, 11 & 12	40.0	26
Murraysburg ...	80.3	51.9	66.1	92.0	9 & 11	45.0	7, 24, 25 & 30
Bedford ...	79.8	53.0	66.4	94.0	9 & 23	45.0	31
Oathcart ...	75.0	50.5	62.7	88.2	8	40.8	31
East London ...	72.8	61.9	67.4	78.0	28	54.0	18 & 31
Sydney's Hope ...	75.3	54.1	64.7	89.0	19 & 29	46.5	31
Stutterheim ...	75.8	55.3	65.5	93.5	22	44.3	31
Chiselhurst ...	80.8	58.4	69.6	93.0	21	52.0	29
Evelyn Valley ...	71.1	49.9	60.5	83.0	22	42.0	31
Queenstown ...	83.3	53.1	68.2	95.5	10	41.0	31
Rietfontein (Aliwal N.) ...	77.3	53.2	65.2	92.1	9	42.9	31
Queenstown ...	83.1	55.5	69.3	99.0	9	44.0	31
Port St. John's ...	77.2	63.7	70.4	84.0	12	55.0	31
Ayliff Mount ...	80.9	57.3	69.1	98.0	9	45.0	31
Main ...	78.1	55.2	66.6	96.0	8	45.5	31
Tabankulu ...	78.1	53.8	66.0	92.0	8	45.0	31
Kokstad ...	78.0	54.1	66.0	94.0	9	45.1	18
Umtata ...	79.2	59.5	69.4	96.0	8 & 22	39.0	22
Teyatejamey ...	77.1	52.2	64.6	87.0	10 & 12	43.0	28
Moochudi ...	89.6	64.0	76.8	100.0	6	53.0	28
Kuruman ...	88.7	55.6	72.2	98.4	10	44.0	26
Hope Fountain ...	84.1	62.1	73.1	93.9	1	57.2	10
Means ...	75.9	55.6	65.7	89.7	...	46.5	...
Extremes ...	...	...	...	100.0	6	39.0	22

RAINFALL, DECEMBER, 1909.

I. CAPE PENINSULA :

	INS.
Royal Observatory (a) 12in. gauge	2·97
Cape Town, Fire Station ..	3·32
Do. South African College	3·04
Do. Molteno Reservoir ...	3·61
Do. Platteklip ...	4·78
Do. Signal Hill ...	1·67
Do. Hospital ...	3·38
Sea Point, The Hall ...	4·21
Do. Atteridge ...	4·32
Camp's Bay ...	2·93
Table Mountain, Disa Head ...	3·35
Do. Kasteel Poort...	6·00
Do. Waai Kopje ...	7·30
Do. St. Michael's ...	8·70
Devil's Peak, Blockhouse ...	5·41
Do. Nursery ...	4·42
Newlands, Montebello ...	8·44
Kenilworth ...	6·59
Wynberg, St. Mary's ...	4·24
Groot Constantia ...	4·70
Tokai Plantation ...	3·93
Muizenberg (St. Res.) ...	5·40
Cape Point... ..	1·07
Blaauwberg Strand ...	1·61
Robben Island ...	2·82
Durbanville ...	2·86
Maitland Cemetery ...	2·79
Tamboers Kloof ...	3·23
Woodhead Tunnel... ..	4·48
Lower Reservoir ...	3·56
Maclears Beacon ...	9·01
Waai Vlei ...	7·97
Woodhead Dam ...	6·90
Retreat ...	3·56

II. SOUTH-WEST :

Eerste River	2·71
Klapmuts	3·37
Stellenbosch, Gaol ...	2·46
Somerset West	2·65
Paarl	2·63
Wellington, Gaol ...	2·35
Groot Drakenstein, Weltevreden	4·01
Porterville Road	1·94
Tulbagh	1·40
Ceres Road	4·40
Ceres	5·66
The Oaks	1·20
Rawsonville	2·44
Caledon	2·40
Worcester, Gaol	1·37
Hex River	1·05
De Doorns	1·97
Karmmelks River	1·97
Lady Grey, Div. Robertson	1·71
Robertson, Gaol	2·91
Do. Govt. Plantation	3·24
Montagu	2·48
Danger Point	1·50
Elgin Plantation	6·86
Elsenberg Agricultural College...	2·66
Roakeen	2·21
Vruchtbaar	2·32

III. WEST COAST :

Port Nolloth (Lient. Barber) ...	0·09
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III. WEST-COAST (continued):

	INS.
Anenous	0·16
Klipfontein	0·15
Kraaifontein	0·35
O'okiep	0·23
Springbokfontein	0·58
Concordia (Krapohl)	0·24
Garies	0·14
Lilyfontein	0·55
Van Rhyn's Dorp	0·25
Clanwilliam, Gaol	0·28
Dassen Island	1·53
The Towers	1·14
Malmesbury	1·63
Piquetberg	1·60
Welbedacht	0·22
Hopefield (Gaol)	0·97
Algeria (Clanwilliam)	1·37
Cedarberg (do.)	2·68

IV. SOUTH COAST :

Cape Agulhas	1·58
Bredasdorp... ..	2·81
Swellendam	4·25
Heidelberg	2·41
Riversdale	4·70
Vogel Vlei	3·67
Moessel Bay... ..	5·26
Gr. at Brak River... ..	6·05
George	8·22
Woodfield (George)	8·91
Millwood	8·37
Sour Flats	7·56
Knyana	5·46
Buffel's Nek	6·90
Plettenberg Bay	5·32
Blaauwkrantz	10·07
Lottering	7·14
Storm's River	7·31
Witte Els Bosch	10·17
Humansdorp	5·49
Cape St. Francis	3·10
Witteklip (Sunnyside)	5·15
Kruis River	2·40
Uitenhage (Gaol)	2·99
Do. (Park)	2·92
Do. (Inggs)	2·57
Armada (Blue Cliff)	2·82
Dunbrody	2·28
Port Elizabeth (Walmers Heights)	3·53
Centlivres	2·39
Potteberg	3·65
Edinburgh (Knysna)	10·97
The Slip, Port Elizabeth	2·86
Gamtoos Station	3·03

V. SOUTHERN KAROO :

Grootfontein	0·77
Ladisuith	1·95
Amalienstein	2·61
Calitzdorp	2·92
Oudtshoorn	1·88
Vlaakte Plaats	2·80
Unionsdale	2·15
Glencorror	1·75

VI. WEST-CENTRAL KAROO :

Fraserburg Road	1·22
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VI. WEST-CENTRAL KAROO : *contd.* INS

Prince Albert	2.01
Beaufort West, Gaol	3.69
Dunedin	1.46
Nel's Poort... ..	2.65
Camfers Kraal	2.11
Krom River	3.02
Roos Plaats	1.89
Baaken's Rug	2.40
Willowmore	1.26
Rietfontein	2.25
Steytlerville	1.68
Lemoenfontein	4.08

VII. EAST-CENTRAL KAROO.

Buffels Kloof	6.07
Aberdeen, Gaol	2.19
Aberdeen Road	1.68
Klipplaat	1.73
Winterhoek	2.38
Kendrew, Holmes	1.26
Do.	0.61
Graaff-Reinet, Gaol	1.61
Do. (College)	1.43
New Bethesda	1.67
Roodebloem	1.56
Glen Harry	1.26
Wellwood	1.61
Do. Mountain	1.70
Jansenville... ..	1.35
Roo de Hoogte	1.58
Toegedacht	1.20
Klipfontein	1.40
Pearston	2.03
Walsingham	1.89
Middlewater	1.14
Somerset East, Gaol	4.41
Middleton	1.62
Spitzkop	2.00
Ryedale	1.13
Zeekoe River (Aberdeen)	3.22

VIII. NORTHERN KAROO :

Calvinia	1.11
Sutherland	0.59
Fraserburg... ..	1.44
Carnarvon	0.94
Brakfontein	2.66
Victoria West	2.07
Wilbeestkooij	1.19
De Kruis (Murraysburg)... ..	1.90
Richmond	1.94
Hanover	1.01
Theefontein	1.34
Philipstown	3.02
Petrusville... ..	2.31
The Willows (Middelburg)	1.27
Colesberg	4.21
Tafelberg Hall	1.39
Varkens Kop	2.49
Culmstock	1.91
Drooefontein	2.26
Oradock (Gaol)	1.65
Witmoos	2.15
Maraisburg	1.86
Steynsburg (Gaol)	2.72
Hillmoor	2.25
Tarkastad	2.14
Do. (Dis. Engineer)	1.81
Drummond Park	2.25
Waverley	2.06

VIII. NORTHERN KAROO (*con.*) : INS

Schuilhoek... ..	2.33
Vosburg	1.58
Zwavelfontein	1.68
Bultfontein (Colesberg)	1.94
Dassiesfontein (Richmond)	1.20
Hartebeestfontein (Steynsburg)... ..	3.52
Willow Walk (Tarkastad)	1.96
Hotweg Kloof (Cradoek)	1.02
Thebus Waters	1.59

IX. NORTHERN BORDER :

Upington	0.07
Trooilapspan	0.00
Van Wijk's Vlei	0.66
New Year's Kraal... ..	0.96
Dunmurry	1.24
Karree Kloof	2.69
Griquatown	0.62
Douglas	1.75
Avoca (Herbert)	1.40
Hope town	0.79
Orange River	0.54
Newlands, Barkly West	4.12
Barkly West	3.64
Kimberley Gaol)	1.68
Strydenburg	0.62
Rietfontein (Gordonia)	0.63
Douglas (Vos)	1.66
Stoffkraal	0.00
Rooklands (Barkly West)	4.35

X. SOUTH EAST :

Melrose (Div. Bedford)	2.19
Dagga Boer	3.05
Fairholt	3.09
Alicedale	2.14
Cheviot Fells	1.30
Bedford (Gaol)	5.00
Sydney's Hope	4.23
Cullendale	3.26
Adelaide	3.06
Atherstone	4.44
Alexandria... ..	3.65
Fort Fordyce	4.66
Graham's Town (Gaol)	4.71
Heatherton Towers	3.10
Sunnyside	4.40
Port Beaufort	2.70
Katberg	7.64
Balfour	3.23
Seymour	2.36
Glencairn	7.09
Port Alfred	4.41
Hogsback	5.13
Peddie	4.31
Exwell Park	3.01
Keiskamma Hoek... ..	2.11
Cathcart (Gaol)	4.91
Cathcart (Forman)	5.84
Cathcart	5.13
Thaba N'doda	3.04
Evelyn Valley	12.23
Crawley	3.22
Thomas River	2.55
Perie Forest	5.95
Isidenge	3.65
Kologha	5.67
King William's Town (Gaol)	2.51
Stutterheim (Wyde) Bousfield	3.63
Fort Cunynghame	3.08
Dohne	3.03

X. SOUTH EAST (continued) :		INS.	XI. NORTH-EAST (contd.)		INS.
Kubusie	...	4.25	Clifton (Sterkstroom)	...	2.61
Quacu	...	4.13	Carrickmore, Moltene	...	5.30
Blaney	...	1.55	Edendale (Queenstown)	...	4.25
Kei Road	...	3.96	XII. KAFFRARIA.		
Bolo	...	3.69	Ida (Xalanga)	...	3.20
Fort Jackson	...	5.65	Slaate (Xalanga)	...	5.51
Komgha (Gaol)	...	4.80	Cofimvaba	...	6.26
Chiselhurst	...	6.05	Tsomo	...	3.62
East London West	...	4.17	N'qamakwe	...	5.07
East London East	...	4.82	Main	...	4.66
Cata	...	4.48	Engcobo	...	5.28
Wolf Ridge	...	5.19	Butterworth	...	3.18
Dontsah	...	5.37	Woodcliff	...	7.88
Mount Coke	...	3.75	Kentani	...	4.60
Blackwoods	...	3.34	Maclear	...	6.90
Albert Vale (near Bedford)	...	3.53	Idutywa	...	1.93
Cathcart (Station)	...	5.92	Baseya	...	8.58
Huxley Farm, Stutterheim	...	3.89	Willowvale	...	4.85
Amabele Junction	...	3.65	Somerville (Tsolo)	...	3.39
Izileni (King Wms. Town) ...	...	4.02	Elliotdale	...	3.31
XI. NORTH-EAST :			Umtata	...	3.56
Venterstad	...	1.65	Cwebe	...	4.49
Mooifontein	...	3.02	Tabankulu	...	4.68
Burghersdorp (Gaol)	...	4.91	Mount Ayliff	...	3.20
Ellesmere	...	3.85	Do., The Willows	...	4.86
Moltene	...	2.42	Seteba	...	4.70
Thibet Park	...	2.61	Flagstaff	...	5.85
Sterkstroom (Station)	...	3.21	Insikeni	...	7.56
Do. (Gaol)	...	2.57	Port St. John's	...	4.87
Rooklands	...	2.68	Umzimkulu	...	3.98
Aliwal North (Gaol)	...	3.25	Maclear (Station)	...	5.96
Do. Do. (Dist. Engineer) ...	...	3.75	Tabankulu (Atkins)	...	3.37
Buffelsfontein	...	3.67	Umzimkulu (Strachan)	...	5.59
Poplar Grove	...	4.86	Lusikisiki	...	8.32
Jamestown	...	6.10	Tent Kop (Elands Height) ...	...	4.81
Whittlesea	...	4.83	Elliot	...	5.73
Queenstown (Gaol)	...	3.11	Elton Grange (Mount Currie) ...	...	3.84
Do. (Benwick)	...	3.41	Ugie	...	9.63
Rietfontein (Aliwal North)	...	6.00	XIII. BASUTOLAND :		
Middlecourt	...	2.92	Mohalies Hoek	...	5.19
Dordrecht	...	3.43	Teyateyaneng, Beren	...	8.13
Tylden	...	2.99	Qacha's Nek	...	5.77
Nooitgedacht	...	1.29	XV. NATAL :		
Herschel	...	7.93	Durban, Observatory	...	8.07
Lady Grey	...	5.72	XVI. BECHUANALAND :		
Lauriston	...	5.34	Taungs	...	2.94
Lady Frere	...	3.68	Vryburg	...	3.22
Contest (Near Bolotwa)	...	3.60	Mafeking	...	3.07
Sterkspruit	...	9.17	Kuruman	...	5.89
Keilands	...	4.25	Zwartlaagte	...	2.56
Barkly East	...	5.11	Nottingham (Mafeking)	...	3.56
Blikana	...	6.35	Masilibitsani	...	4.39
Cliftonvale	...	3.45	Armadillo Creek	...	5.89
Albert Junction	...	4.74	Mochudi	...	7.06
Hughenden	...	3.62	XVII. RHODESIA :		
Glenwallace	...	2.43	Hopefontain	...	7.74
Indwe (Dist. Eng's Office) ...	...	4.32	Rhodes Matoppo Park	...	7.25
Queenstown (Dist. Engineer) ...	...	3.29			
Dordrecht (Dist. Engineer) ...	...	2.92			
Lady Grey, Station	...	5.61			
Indwe (Collieries)	...	5.30			
Stormberg Junction	...	2.66			
Hopewell (Imvani)	...	3.92			
Sunnymeade (Div. Albert)	...	1.17			

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FOR
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 In SHEEP and GOATS
AND
PREVENTATIVE FOR TAPEWORM IN LAMBS.



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CURRENT MARKET RATES (WHOLESALE) OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 22nd January, 1910, ruling at the several centres named, is published for general information.

CENTRE	A. Wheat per 100 lbs.	B. Wheat Flour per 100 lbs.	C. Roor Meal per 100 lbs.	D. Mealies per 100 lbs.	E. Mealie Meal per 100 lbs.	F. Barley per 100 lbs.	G. Oats per 100 lbs.	H. Oat-hay per 100 lbs.	J. Lucerne Hay. per 100 lbs.	K. Potatoes per 100 lbs.	L. Tobacco (Boer Roll) per lb.	M. Beef per lb.	N. Mutton per lb.	O. Fresh Butter per lb.	P. Eggs per doz.	Q. Cattle (Slaughter) per doz.	R. Sheep (Slaughter)
Alfred North	£ 5. 6	£ 1. 6	£ 12. 9	£ 5. 9	£ 7. 6	£ 3. 0	£ 10. 0	£ 5. 5	£ 3. 9	£ 12. 0	£ 1. 0	£ 0. 7	£ 0. 5	£ 1. 3	£ 1. 0	£ 10	15/-
Beaufort West	£ 12. 0	£ 17. 0	£ 14. 6	£ 6. 8	£ 8. 6	£ 11. 0	£ 8. 0	£ 4. 0	£ 5. 0	£ 4. 0	£ 1. 0	£ 0. 2	£ 0. 3	£ 1. 6	£ 1. 0	£ 9	12/-
Burgersdorp	£ 8. 0	£ 17. 8	£ 13. 3	£ 6. 9	£ 8. 3	£ 6. 0	£ 9. 0	£ 4. 6	£ 5. 0	£ 7. 0	£ 1. 0	£ 0. 6	£ 0. 3	£ 1. 0	£ 1. 0	£ 10s.	12/6
Cape Town	..	..	..	..	..	..	£ 0. 8	£ 3. 11	£ 6. 0	£ 7. 0	..	..	..	£ 1. 3	£ 12. 0	..	..
Clareville	11/-, 11/6	..	12/- to 13/-	£ 6. 0	..	..	£ 6. 0	£ 5. 3	..	£ 5. 0	£ 1/-	4d., 5d.	3d. to 3d.	1/-, 1/3	£ 1. 0	..	..
Colony	£ 11. 0	..	..	£ 6. 0	..	..	£ 6. 0	£ 5. 3	..	£ 10. 0	..	..	£ 0. 3	£ 0. 9	£ 1. 0	..	..
Conak	£ 9. 0	..	..	£ 6. 0	..	..	£ 6. 0	£ 5. 3	..	£ 10. 0	..	..	£ 0. 3	£ 0. 9	£ 1. 0	..	..
Dordrecht	£ 0. 9	£ 1. 0	£ 16. 0	£ 6. 3	£ 7. 6	£ 9. 0	£ 8. 0	£ 5. 0	£ 6. 0	£ 8. 0	£ 1. 0	£ 0. 3	£ 0. 3	£ 0. 7	£ 1. 0	£ 10	12/6
East London	£ 0. 9	£ 18. 0	£ 15. 0	£ 7. 0	£ 7. 0	£ 6. 6	£ 5. 0	£ 4. 0	£ 5. 6	£ 7. 6	£ 1. 0	£ 0. 4	£ 0. 3	£ 1. 0	£ 1. 0	£ 10	20/-
Grass. Beinet	£ 11. 3	..	..	£ 6. 3	..	..	£ 6. 3	£ 4. 0	£ 6. 0	£ 7. 6	..	£ 0. 4	£ 0. 3	£ 1. 0	£ 1. 0	..	..
Grassmestown	£ 11. 0	£ 16. 3	£ 14. 0	£ 4. 8	£ 5. 6	£ 6. 3	£ 6. 3	£ 5. 6	£ 4. 8	£ 11. 0	£ 5d.	£ 0. 8	£ 0. 5	£ 0. 9	£ 0. 10	£ 7. 15s.	11/3
Kimberley	£ 10. 0	£ 18. 0	£ 15. 0	£ 5. 9	£ 7. 0	£ 7. 6	£ 7. 0	£ 4. 0	£ 4. 0	£ 5. 0	£ 0. 4d.	£ 0. 4d.	£ 0. 4d.	£ 0. 10d.	£ 1. 0	£ 12	16/-
King William's Town	£ 10. 6	£ 15. 0	£ 12. 6	£ 7. 6	£ 7. 6	£ 6. 0	£ 6. 0	£ 3. 0	£ 3. 0	£ 6. 0	£ 1. 0	£ 0. 6	£ 0. 6	£ 1. 3	£ 1. 2	£ 12	15/-
Malmesbury	£ 12. 9	£ 18. 6	£ 14. 0	£ 7. 0	£ 10. 0	£ 6. 3	£ 6. 0	£ 4. 6	£ 4. 6	£ 6. 0	£ 0. 9	£ 0. 6	£ 0. 6	£ 1. 0	£ 1. 3	£ 15	15/-
Mossel Bay	£ 13. 0	£ 19. 6	£ 19. 0	£ 5. 6	£ 10. 0	£ 8. 0	£ 8. 0	£ 2. 6	£ 2. 6	£ 9. 0	£ 0. 9	£ 0. 6	£ 0. 6	£ 1. 0	£ 1. 0	£ 10	..
Port Alfred	£ 10. 6	£ 10. 6	£ 10. 6	£ 6. 9	£ 10. 0	£ 5. 9	£ 5. 9	£ 4. 6	£ 4. 6	£ 9. 0	£ 0. 4	£ 0. 6	£ 0. 6	£ 0. 9	£ 1. 0	£ 1. 0	..
Port Elizabeth	£ 10. 0	£ 12. 0	£ 13. 0	£ 5. 3	£ 8. 6	£ 11. 0	£ 9. 0	£ 4. 0	£ 7. 0	£ 5. 0	£ 0. 4	£ 0. 6	£ 0. 6	£ 0. 9	£ 1. 0	£ 1. 0	15/-
Queenstown	£ 10. 0	£ 1. 2	£ 15. 0	£ 6. 6	£ 13. 0	£ 7. 0	£ 4. 6	£ 4. 0	£ 3. 6	£ 6. 0	£ 1. 0	£ 0. 6	£ 0. 4	£ 1. 0	£ 1. 0	£ 7	15/-
Thurston	£ 14. 0	£ 1. 0	£ 12. 6	£ 4. 0	£ 6. 6	£ 9. 0	£ 8. 6	£ 6. 0	£ 5. 6	£ 8. 0	£ 0. 4	£ 0. 8	5d. to 7d.	£ 1. 6	£ 1. 0	£ 8 to £ 10	9/- to 12/-
Vryburg	£ 10. 6	£ 15. 6	£ 12. 6	£ 7. 6	£ 8. 6	£ 7. 6	£ 5. 0	£ 3. 0	£ 4. 8	£ 5. 0	£ 0. 6	3d. to 7d.	£ 0. 3	£ 1. 0	£ 1. 3	£ 9. 10s to £ 10	11/6 to 13/6
Worcester	£ 10. 6	£ 15. 6	£ 12. 6	£ 7. 6	£ 8. 6	£ 7. 6	£ 5. 0	£ 3. 0	£ 4. 8	£ 5. 0	£ 0. 6	3d. to 7d.	£ 0. 3	£ 1. 0	£ 1. 3	£ 9. 10s to £ 10	11/6 to 13/6

NOTE.—A blank space denotes "no transactions."

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PRODUCE MARKETS.

CAPE TOWN.

Mr. R. Müller (Produce Department) reports for the month ending January 31st:—

Ostrich Feathers.—For all good qualities high prices are being paid, but buyers can also be found for other classes, provided that holders are prepared to accept what is being offered. Most of the Feathers, which have arrived here recently, were shipped to London. The local trade is carried on a sound basis. For really good Feathers there exists an exceptionally good demand.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes ...	19	0	0	33	0	0	Floss ...	0	7	6	1	10	0
First, ordinary to							Long Drabs ...	2	5	0	4	0	0
Seconds ...	11	5	0	15	0	0	Medium Drabs ...	0	15	0	1	10	0
Seconds ...	7	10	0	8	10	0	Short to Medium ...	0	5	0	0	15	0
Thirds ...	3	0	0	5	10	0	Floss ...	0	5	0	1	5	0
Femina Super ...	9	10	0	16	0	0	White Tails ...	1	2	6	2	0	0
Do., Seconds to							Coloured Tails ...	0	12	6	1	5	0
Firsts ...	4	10	0	10	10	0	Chicks... ..	0	1	0	0	2	6
Byocks (Fancy) ...	4	5	0	8	0	0	Spadonas ...	0	10	0	1	15	0
Long Blacks ...	2	15	0	6	10	0	Inferior Black and						
Medium Blacks ...	1	10	0	3	10	0	Drabs, short to						
Short to Medium ...	0	10	0	1	5	0	long ...	0	0	6	1	10	0

Wool.—Only small quantities were offered for sale here recently. Prices realised were satisfactory, and competition proved all that could be desired. As highest prices the following were reached by Malmesbury and Piquetberg Summer Wool, 6½d.; Coarse and Coloured, 4d.; Calvinia Lambs, 6½d.; Calvinia Medium Long, 6½d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld ...	0	6	0	9½	Wool for Washing ...	0	4½	0	7½
Do. Karoo ...	0	6	0	7½	Snow-white Super to Extra	1	4	1	9
Medium ...	0	5	0	6½	Do. Ordinary ...	1	2	1	5
Short and inferior ...	0	3	0	4½	Fleece Washed ...	0	0	0	10

Mohair.—The Market in this article is rather lifeless, although really good qualities meet with fair competition.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer ...	0	6	1	1	Winter ...	0	9	0	9½
Kids ...	1	3	1	8	Do. Kids... ..	0	11	1	2½
Seconds ...	0	5	0	9					

Hides and Skins.—The demand remains good and prices realised are in sellers' favour. Consignments from the country should be sent on, to make sure of deriving benefit from the satisfactory state of the market.

	s.	d.	s.	d.		s.	d.	s.	d.
Long woolled Skins ...	0	5½	0	6½	Goat, heavy to light ...	0	10½	1	2½
Short ...	0	4	0	4	Sundried ...	0	0	0	6
Shorn ...	0	0	0	3	Angoras ...	0	4	0	6½
Bastards ...	0	3½	0	4	Sundried Hides ...	0	6½	0	7½
Cape Skins, each ...	2	2	2	8	Salted ...	0	5½	0	7
Do., cut, each ...	0	0	1	1	Wet ...	0	3½	0	4½

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PORT ELIZABETH.

Messrs. John Daverin and Co. report under date January 28:—

Ostrich Feathers.—There was again a full three and a half days' sale held this week, when the usual average assortment was offered. Competition was fairly active, and prices satisfactory, especially for super qualities. The total quantity sold amounted to £15,526 10s. 5d., and weighed 6,311 lbs. 7½ ozs. The London Sales open on the 7th prox., when about £250,000 value will be offered. Our latest cable advice is that a steady market is expected.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.	
Primes: Extra Super				Special Prices.			Blacks: Long	...	2	0	0	to	7 0 0	
Good to Super ...	20	0	0	to	35	0	Medium	...	1	0	0	"	3 0 0	
Whites: Firsts	...	12	0	0	"	18	0	Short	...	0	4	0	"	1 0 0
Seconds	...	5	0	0	"	11	0	Wirey	...	0	0	3	"	0 0 6
Thirds	...	1	5	0	"	4	10	Floss	...	0	4	0	"	0 18 0
Feminas: Super	...	10	0	0	"	20	0	Drabs: Long...	...	1	5	0	"	4 0 0
Firsts	...	6	10	0	"	10	10	Medium	...	0	10	0	"	1 10 0
Seconds	...	2	10	0	"	7	10	Short...	...	0	1	6	"	0 7 6
Thirds	...	0	15	0	"	3	0	Wirey	...	0	0	3	"	0 0 6
Greys	...	1	10	0	"	7	0	Floss...	...	0	4	0	"	0 18 0
Fancy ...	...	3	0	0	"	8	10	Spadonas: Light	...	0	5	0	"	4 10 0
Tails: White ...	...	0	10	0	"	2	0	Dark	...	0	2	6	"	1 15 0
Light ...	...	0	10	0	"	1	15	Chicks...	...	0	0	6	"	0 12 6
Coloured & Dark	0	0	6	"	0	15	0							

Wool.—The tone of this market has become quieter, although at present there is no quotable change in prices. A fair amount of business has been done in the open market. At the Catalogue Sale on Wednesday 3,077 bales were offered, of which only 907 bales were sold. Competition was not so active as it was last week, hence the large proportion withdrawn. On the Public Market yesterday a fair quantity was offered, prices showing some weakness.

Snowwhite, Extra Superior	...	20½d	to	21½d	Grease, Coarse and Coloured	...	1½d	to	4d
Do. Superior	...	18d	"	19½d	Scoured do.	do.	1½d	"	8½d
Do. Good to Superior	...	17d	"	17½d	Basuto Grease, short	...	6½d	"	6½d
Do. Inferior Faulty	...	14d	"	15d	O.R.C. Grassveld Grease, long				
Grease, Super Long, well-con-					& well-conditioned				
ditioned, Grassveld					(special clips)	7½d	"	8d	
grown (special clips)	...	8½d	"	10d	Do. do. do.	...	6½d	"	7d
Do. do. do.	...	7½d	"	8½d	Do. do. medium grown,				
Do. do. Karoo grown					light, with little				
(special clips)	7½d	"	8½d		fault	...	6d	"	6½d
Do. do. do.	...	6½d	"	7½d	Do. do. short, faulty & wasty	4½d	"	5½d	
Do. do. Mixed Veldt...	7d	"	7½d		Do. do. Karoo grown, long &				
Do. Light, faultless, medium					well-conditioned	...	6½d	"	7½d
Grassveldt grown	...	6½d	"	7½d	Do. do. medium grown, light				
Do. do. Karoo grown	6½d	"	7½d		with little fault	...	6d	"	6½d
Do. do. short, do.	6d	"	6½d		Do. do. short, faulty and				
					wasty	...	4½d	"	5½d

Mohair.—There is nothing new to report in this market, which remains steady, but the amount of business done has been small. On the Public Market on Tuesday a limited quantity was offered, prices showing no change.

Super Kids	...	...	None offering	Mixed O.R.C. Hair (average)	8½d	to	10½d
Ordinary Kids and Stained	...	...	do.	Do. very mixed	...	7d	8d
Superior Firsts, special clips	...	12½d	to 12½d	Seconds and Grey	...	5d	7½d
Ordinary Firsts	...	...	11½d " 12d	Thirds	...	4½d	4½d
Short Firsts and Stained	...	...	10d " 10½d	Winter Kids, special clips	...	16d	16½d
Superfine Long Blue O.R.C.				Do. good ordinary	...	14d	15d
Hair	...	...	10½d " 13d	Winter Hair	...	9½d	10d
				Basuto Hair	...	8½d	10d

Skins.—Sheepskins in bundles sold this week at 5½d., and Pelts at 4½d. per lb.; Capes, 25d.; damaged, 7½d. each; Goatskins, 13½d.; damaged, 7½d. per lb., and Heavy Goatskins, 8½d.; Angoras, 7½d.; Shorn, 5½d.; damaged, 3½d. per lb.; Johannesburg Sheep, 5½d.; Goat, 9d.; Angoras, 6½d.; Springbok, 8½d. each.

Hides.—Sundried, 8½d.; damaged, 8½d.; Salted, 8½d.; damaged, 7½d.; Thirds,

3d.

Horns.—3½d. each all round.

EAST LONDON.

Messrs. Malcomess and Co. report for the month ending January 31 :—

Wool.—The first of six series for 1910 of London Colonial Wool Sales opened on the 18th inst., prices as compared to last Sales close ruling unchanged. Since then the values of Short Grease and Long Heavy Combing Grease have proved irregular, being quoted par to 5 per cent. lower. Snow-whites, on the other hand, are 5 per cent. to $7\frac{1}{2}$ per cent. higher, which is due to their scarcity. The Bradford Wool Market is quiet and unchanged. As regards the local Wool Market, a noteworthy feature has been the second Wool Fair Competition, inaugurated last year by the Chamber of Commerce. There were two groups—number 2 comprising Tarkstad, Winterberg, Whittlesea and Bedford districts; number 3 comprising Barkly, Dordrecht, Indwe, and East Griqualand. Group 2 first prize, £40, was awarded to G. James, of Whittlesea; second prize, £20, was awarded to C. G. Hay, of Whittlesea; third prize, £10, was awarded to E. James, of Whittlesea. All these Wools were very long, strong, nice bright Wools, very well got up, although yolky in condition. They excited keen competition, and realised up to 9 $\frac{3}{4}$ d. for the best sorts. Group 3: First prize, £40, was awarded to H. Benson; second prize, £20, was awarded to F. Myburg; third prize, £10, was awarded to M. T. Benson. These Wools were dry, well got up, which is the best that can be said of them, as they were mostly lacking in style, length and condition. The best sorts made up to 8 $\frac{3}{4}$ d.; this Wool was very light and dry.

During the month a rather big weight of Wool has been offering on the Public Sales, and a fair clearance has been effected. On the 6th inst. 4,300 bales were offered, 2,300 sold; 12th inst., 1,900 bales were offered, 1,100 sold; 19th inst., 4,300 bales were offered, 2,300 sold; 26th inst., 4,300 bales were offered, 2,500 sold; in addition to which some 4,000 bales have been disposed of out of hand, bringing the total sales up to between 12,000 and 13,000 bales.

The market has been firm, and the tendency gradually against the buyer. We do not think prices can go any higher, as there is not sufficient encouragement from consuming centres to justify any further advance. Although Wools are passing quickly into consumption, there is still an enormous weight to be dealt with, and we shall not be surprised to see values go against sellers before 30th June next.

Super long light Kaffrarian Farmers and similar well-conditioned Wools	9 $\frac{1}{4}$ d to 11d	Good long well-conditioned Grass Veldt	6d to 7 $\frac{1}{4}$ d
Super short ditto	7 $\frac{1}{4}$ d .. 8 $\frac{1}{4}$ d	Good short ditto ditto	5d .. 6 $\frac{1}{4}$ d
Long well-skirted Farmers	7 $\frac{1}{4}$ d .. 9 $\frac{1}{4}$ d	Heavy, faulty wasty, long Grease	5 $\frac{1}{4}$ d .. 6 $\frac{1}{4}$ d
Super short ditto ditto	6 $\frac{1}{4}$ d .. 7 $\frac{1}{4}$ d	Heavy, faulty wasty Short Grease	5d .. 5 $\frac{1}{2}$ d
		Coarse and Coloured Grease	2 $\frac{1}{4}$ d .. 5d

Mohair.—This staple is in good demand, but the supply is restricted. The most important sale of the month being ours of 40 bales Winter Kids at 15d., and 140 bales Winterhair at 10d. We quote other sorts as follows :—Superior Long Blue, 12 $\frac{1}{2}$ d.; Average Long Blue, kempy, 10 $\frac{1}{2}$ d. to 11d.; Average to Superior Basuto Mohair, 10d. to 10 $\frac{3}{4}$ d.; Seconds, 5d. to 6 $\frac{1}{4}$ d.; Dockings and Grey, 3 $\frac{1}{2}$ d. to 5d.

Sundry Produce.—S.D. Hides, 9 $\frac{3}{4}$ d.; D.S. Hides, 8 $\frac{3}{4}$ d.; Goatskins 12 $\frac{3}{4}$ d.; Angora-skins, 8 $\frac{1}{4}$ d.; Damages, each, 7d.; Sheepskins, 5 $\frac{3}{4}$ d.; Pelts and C.C. skins, 4 $\frac{3}{4}$ d. Transkeian and King William's Town parcels, 4d. to 4 $\frac{1}{2}$ d.; Horns, according to size and quality, 2d. to 4d. each.

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BERKSHIRE BOARS.—Pure bred. Ages two to fifteen months. Bred by Charles Leonard, Esq. on his well known "Gloria" Estate.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co., Ltd., Porterville Road.

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CONTENTS.

	PAGE
NOTES	276
Government Assistance to Veterinary Students—Dunn Building (A peculiar experience)—Loans for Vermin Proof Dividing Fences—Chemical Changes in Ensilage—Ladder and Derrick (<i>Illustrated</i>)—Fowl Cholera or Blue Comb—Insecticide Device for Cattle—Salt for Sheep—Weir across the Fish River at Baroda (<i>Illustrated</i>)—Practical Agricultural Co-operation—The Care of Farm Implements—South African Wool and the Wool Market—Export of Fruit to Rhodesia—London Ostrich Feather Sales.	
DRY LAND FARMING (<i>Illustrated</i>)	286
SCAB LEGISLATION UNDER UNION	291
RURAL CAPE COLONY (<i>Illustrated</i>)	307
VELD DETERIORATION	323
SHOW DATES, 1910	326
AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS (<i>continued</i>)—(<i>Illustrated</i>)	327
SOIL EVAPORATION (<i>Illustrated</i>)	342
FRUIT EXPORT FOR JANUARY, 1910	348
FLAX OR LINSEED	349
SEED TESTING (<i>Illustrated</i>)	351
THE DESTRUCTION OF PRICKLY PEAR BY THE USE OF JANSEN'S EXTERMINATOR	354
A LESSON IN CLOSER SETTLEMENT	355
RETURN OF OUTBREAKS OF CONTAGIOUS DISEASES	358
EAST COAST FEVER	359
MILK RECORD	365
CORRESPONDENCE	367
South African Dairy Industry—The Destruction of Moles and Beetles—The Mystery of the Mud Turtle—A Strange Occurrence—Poisoning Jackals (Yet another Cute Dodge)—Fertilisation of Turkeys—Boring for Water—Mudfish—Circular Sheep Dips.	
NOTES ON THE WEATHER OF DECEMBER, 1909	375
RAINFALL	379
CURRENT MARKET RATES	383
PRODUCE MARKETS	385

NOTES.

Government Assistance to Veterinary Students.

With reference to Government Notice No. 1426 of the 21st December, 1909, inviting applications from young Cape Colonists for Government assistance to proceed to Europe for the purpose of qualifying as Veterinary Surgeons, it is notified that bursaries of £75 each per annum, tenable for four years, have been awarded to the following applicants, for the purpose stated, viz.:—

Mr. B. J. Brummer, Barkly East.
Mr. D. M. Ireland, Cradock.
Mr. G. H. Melck, Darling.
Mr. B. van der Vijver, Bedford.

Dam Building.—A Peculiar Experience.

Mr. F. E. Kanthack, Director of Irrigation, writes:—In the *Agricultural Journal* for January, 1910, a correspondent from Westminster, O.R.C., relates the circumstances under which a dam failed, and appears at a loss to understand the cause. The conditions are very likely as follows:—The bed of the sloop is an alluvial deposit, laid down in times of old by successive floods, and consists of alternating layers of gravel, sand and clay. In a flood gravel is deposited during the high stages. As the flood subsides coarse sand is deposited, and finally fine mud, which in course of time may become a pot-clay. When building a dam across a sloop or river farmers are apt to be misled by the appearance of these thin layers of pot-clay, and imagine they have obtained a good foundation. Such strata of clay are seldom thick, and rarely continuous over the whole submerged area, and when subjected to considerable pressure due to water impounded in the dam, failure is very likely to occur, owing to the water bursting through underneath the dam, thus undermining its foundation and causing the dam itself to collapse. In some cases the water bursts through beneath the dam suddenly, giving rise to an explosive effect below. Where dams are built the foundations must be thoroughly tested by the sinking of trial pits and boreholes, as otherwise considerable risks must be run. It is with a view of preventing all leakage below a dam which might lead to failure of this kind that costly puddle and concrete cores are resorted to.

From "Farmer's" description it would further appear that there is a dyke crossing the sloop at some distance below the site of the dam. Dykes of this kind should be sought for as foundations wherever possible.

Loans for Vermin Proof Dividing Fences.

Special attention is directed to regulations issued by Proclamation No. 44, 1910, under the Loans Act for Vermin Proof Fencing. The application form is published with the Proclamation in the *Gazette*, from which full particulars can be obtained. All applications must be addressed to the Resident Magistrate of the District. If the amount applied for does not exceed £100 the period of repayment may not exceed five years, and if such amount exceeds £100 it must be repaid in not more than ten years; but it is competent to pay at any time within the period of five years or ten years the value at that time of the unpaid instalments in one sum.

The Regulation Vermin Proof Fence.—It is stipulated in the regulations that a vermin proof fence shall be a fence constructed in the following manner and of the materials herein described, viz.:—

- (a) *Wire netting fence.*—The fence must not be less than 4 feet in height from the ground to the level of the top wire. Netting 3 feet wide, 14 gauge, and 3 to 3½ inch mesh must be used. This netting must be attached to not less than three running wires, No. 6. Above the netting must be placed not less than three barbed wires with barbs not more than 3 inches apart. These three wires must be set as follows:—No. 1, 3 inches above the netting; No. 2, 4 inches from No. 1; and the last 5 inches from No. 2. Running barbs must be strapped from the top wire of the fence to the plain wire at the top of the netting every 2 to 3 feet, a double strap of wire not thinner than No. 10 to be used. Droppers must be inserted every 3 to 9 feet across the entire fence. The fence must be securely packed at the bottom with stones. If this is not done, 4-foot netting must be used, of which one foot must be laid flat on the ground; or
- (b) *Kitselman Fence.*—Thirteen plain wires not lighter than No. 10, preferably No. 8, must be woven with No. 14. This will give a 5-foot fence. The height might be reduced to 4 feet by removing wire from the top down but not in between; or
- (c) *Barbed Wire.*—Thirteen wires must be used and set as follows: First one, 2 inches from the ground. From there up to the espacement as follows: 3, 3½, 4, 4, 4, 4, 4, 5, 5, 6 and 6 inches, making a total of 4 feet 6½ inches. Not less than seven 3-inch barbs must be used. If wire of 3-inch barbs only is employed an extra ½ inch may be allowed between the wires throughout. Droppers or double laces of No. 7 or No. 8 wire must be placed every 3 feet apart.

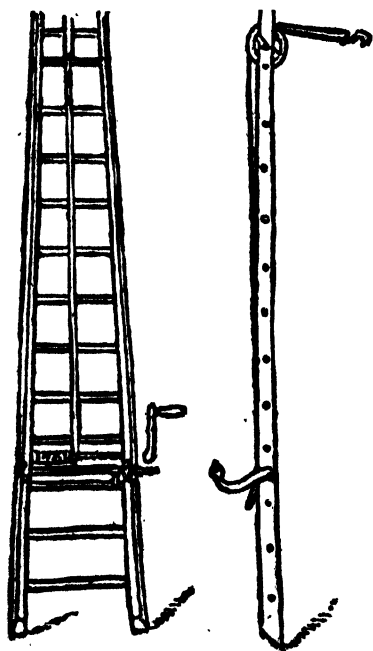
Poles or standards must be, in the case of each kind of fence, 20 to 30 feet apart, depending on the pole used. The lighter the pole or standard the nearer together these must be planted.

Chemical Changes in Ensilage.

Several theories have been advanced by scientists to account for the changes that take place in the silo, and to explain why ensilage keeps so long. The only point definitely settled, and, so far as the stock-owner is concerned, it is the most important, is that these chemical changes are accompanied by a material loss of organic matter. The extent of the loss varies with the manner in which the ensilage is made. With properly made ensilage the loss will not be great; in an ill-made stack or pit the greater part of the contents may be ruined. It is still an open question whether the alterations which the mass of green stuff undergoes is due to the activity of certain ferments or whether the changes are due to respiratory processes, which continue so long as the plant cells live. Recent investigations point to the probability that the latter explanation is the correct one. Scientists are still engaged worrying out the problem, in the face of great difficulties, and, incidentally, their researches furnish interesting and helpful information to the siloist. It has been shown that

the loss of organic matter, under practical conditions, during the conservation of maize, is never less than 15 per cent., and on this account opposition to the practice of silaging has been raised by advocates of dry feeding. But the advantage of securing a milk-producing feed overweighed this objection, apart altogether from the fact that when stock are fed with hay there is always more or less waste from the trampling and soiling of the stuff. Any controversy is speedily closed by men who have tried both methods, and they are the only persons whose opinions are worth having. No man who has successfully made ensilage ever thinks of feeding hay while he has a stock of the preserved green fodder on hand, and no man has been unsuccessful in making ensilage when he cuts the crop at right time, and has properly compacted the pit. These are the two principal causes of failure, which experience will soon remedy. The loss of organic matter is largely proportionate to the amount of air admitted to the mass, so that close packing or trampling down is essential.

Ladder and Derrick.



This contrivance (says an Australian paper) is one that farmers would often find most useful. It is often necessary to raise heavy weights off the ground in the work of a farm, and with this simple apparatus a slaughtered pig or bullock can be hung up by one man with ease. Very often, too, it is necessary to put some heavy article upon a cart or wagon, such as a plough or other instrument. With the help of this derrick it can be done single-handed far quicker than two men could do it without this mechanical aid. Any good, strong ladder will answer the purpose. A sloping notch is cut into the upper end of each rail for the pulley axle to slip into. A 1-inch hole is bored through each rail near the lower end for a round bar of iron to pass through. One end of this bar is squared for a handle. Fasten the end of a rope to the bar, pass the other over the pulley, and with the top of the ladder resting against the

beam, crossbar, or side of a building, one man can raise an enormous weight. The arrangement for the derrick does not in the least impair, but simply increases the usefulness of the ladder.

Fowl Cholera or Blue Comb.

This disease, which is such a scourge in South Africa, under various names, has caused serious loss to poultry-keepers on the Continent of Europe and in North America. Its cause is a microbe, a minute ovoid bacillus, found in the blood, organs, and contents of the intestines of the infected animals. It passes into their droppings, and so is taken up in

the food or drinking water of the healthy birds. Occasionally the disease is introduced into a flock by the purchase of infected birds, by infection picked up at poultry shows, or by birds being put into contaminated crates belonging to dealers or other persons. The microbe, however, is very easily destroyed by a weak solution of carbolic acid, or sulphuric acid. It also dies after an exposure to sun and air.

Symptoms.—The period of incubation is very short, in some cases not more than eight hours, while it rarely exceeds sixteen. Fowls that have pecked the dead body of a comrade have been known to develop the disease in twenty-four hours. The disease takes two forms, the acute and the chronic. In the first case, the course of the illness is very rapid, and it frequently happens that no symptoms are observed, the bird dying before it is noticed as being ill. It may collapse in its walk, or fall from its perch to the ground and die, after giving a few flaps of its wings. But the symptoms when they are noticeable are as follows:—Affected birds become depressed, huddle themselves together and hide their heads under their wings. The feathers become ruffled, the wings and tail droop, and the birds sway from side to side or stagger. The appetite is lessened, while thirst is greatly increased. There is a discharge from the eyes, nose, and beak, and the comb and wattles turn bluish red. The most marked symptom, however, is diarrhœa. The evacuations are frequent and watery, being white or yellow at first and becoming greenish and fœtid as the disease progresses, while the feathers round the hind parts become matted together. Except in the specially acute form mentioned above, the disease lasts from one to three days, though cases are on record where the illness was prolonged for a week. The birds usually die in a state of stupor or convulsions. The death-rate in acute cases is very high, sometimes reaching even 80 or 90 per cent.

In the chronic form the more violent symptoms are not present, but the bird becomes thin and bloodless and suffers from constant diarrhœa. Sometimes there is a breaking out on one or more of the joints, and the inflammation then set up naturally retards the recovery of the sick bird. Towards the end of an epidemic, however, milder cases occur, among which there are a greater number of recoveries.

Appearance after Death.—In ordinary cases the only marks visible to the naked eye will be found in the intestinal tract, the contents of which are watery, frothy and sometimes bloodstained. In the intestinal wall and particularly in the mucous membrane are formed patches of clotted blood, and areas of congestion ranging in colour from red to purple and black. The liver and spleen are usually enlarged, while in some cases the lungs are consolidated. In some places the mucous membrane may be destroyed and in others patches of yellow exudate may be found. It must be remembered, however, that there are other poultry diseases with which it can easily be confused by the inexpert, and that in certain cases a microscopical examination is necessary.

Precautions.—1. All newly purchased birds should be isolated for a day, and the same course should be adopted in the case of birds returning from a poultry show.

2. Crates and packing material should always be disinfected, and care should be taken to secure an uncontaminated supply of food and drinking water.

3. When the disease appears all infected birds should be strictly isolated, and healthy ones should be moved to fresh ground. The infected runs and pens should be sprayed with a disinfectant, such as a 5 per cent. solution of carbolic acid, or 2 per cent. of commercial sulphuric acid in water.

Remedy.—There is no practical medical treatment which can be advised for diseased birds. A protective serum is in use on the Continent of Europe, but the small value of poultry renders the extensive use of this remedy too costly, except perhaps in the case of valuable pedigree birds.

Insecticide Device for Cattle.

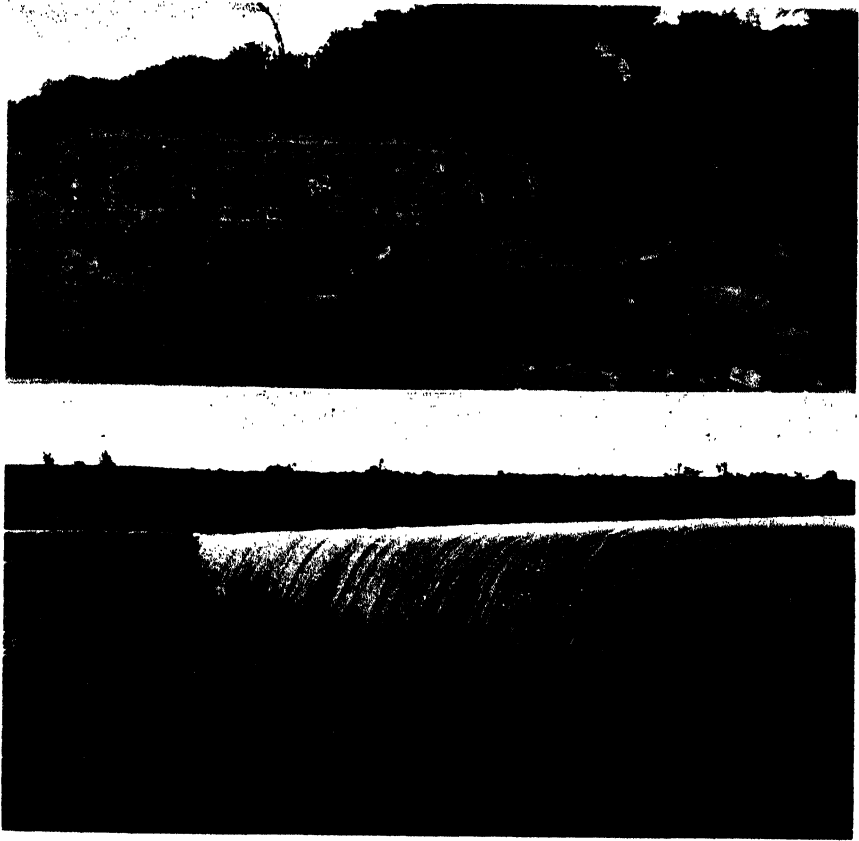
"A Nebraska inventor," *The Scientific American* reports, "has carried the automatic idea to the extent of enabling live-stock themselves to apply insecticide or soothing oil to parts that are irritated or affected by vermin. The invention consists of a rubbing post in which is a reservoir filled with the insecticide, and which may be placed at any suitable place convenient to the live-stock. The rubbing post is formed with a central reservoir, in which the oil is kept. Between this and the outer casing of the post is a felt-like filling. A wick serves to carry the oil from the reservoir to this filling. The outer casing of the post is perforated, so that when the animal rubs against it the oil will exude from the perforations, and be spread upon the affected part."

Salt for Sheep.

It is not an accidental craving that causes sheep to so eagerly devour salt, but rather is it a real physical want that demands satisfaction. Hydrochloric acid is one of the chief constituents of the gastric juices of the stomach that play so active a part in digestion, and it is to help supply the chlorine of this acid that salt is necessary. It will be noticed that when sheep have not had salt for a long time they eat it in simply enormous quantities. This is because the supply of chlorine has become depleted and requires replenishing. So it is not simply to lend variety or improve the flavour of food that salt should be given, but rather to supply chlorine for the gastric juices. Another reason why salt is useful to sheep is because it increases their thirst, and causes them to drink water in sufficient quantities to carry on the normal functions of the body. If foods are eaten, and only a small amount of water drunk, impaction often occurs in the digestive tract, and trouble or loss ensues. Moreover, when the water supply is small, the assimilated food is not so readily carried to different parts of the body and distributed to the tissues. Particularly when sheep are on grass and crops do they need salt, because these crops contain potassium salts. Potassium has a greater affinity for chlorine than hydrogen. Hence, unless plenty of chlorine is supplied to the body, the potassium takes a portion of that which otherwise would combine to form hydrochloric acid. It is a mistake to give sheep salt only occasionally, and in large quantities, for under these conditions their appetites are so sharpened for it that they eat too much. If it is kept constantly before them when they can eat it at will, they will eat what is necessary for the carrying on of bodily functions, and will not take too much at once.—*Exchange.*

Weir across the Fish River at Baroda.

Mr. Will. Allan, of Brak Vallei, Baroda, has successfully completed the weir shown below on the Great Fish River. The upper view shows the details of the masonry work, while the lower one shows the river running with two feet of water over the weir. This work was designed by the Irrigation Department, and is built of hammer-dressed stone and cement, with a cement concrete core and concrete crest. The dimensions are:—Length, 200 feet; height (average), 9 feet; base, 8 feet; crest, 4



Weir on Fish River, at Brak Vallei, Baroda.

feet 6 inches. The wing wall is 85 feet long over all; base, 6 feet 6 inches; top, 2 feet 6 inches; height above base, 26 feet; and height above crest of weir, 13 feet. Mr. Garrett, took the levels and Mr. Newman passed the scheme and inspected the work during construction.

Practical Agricultural Co-operation.

In an interesting leaflet issued by the British Board of Agriculture the practical application of co-operation to agriculture is very clearly outlined. It is here shown that Agricultural Co-operation may be applied in four ways:—(1) The joint purchase of farm requisites, such as

artificial manures, feeding stuffs, seeds, and implements; (2) The joint sale of agricultural produce; (3) Mutual insurance; and (4) Credit banks and loan societies on co-operative lines. As the first two are most applicable to South African conditions as at present existing we append the following details.

Societies for the Purchase of Farm Requisites.—This kind of society is obviously the most simple and most readily adapted to farming needs. Indeed, there are some large associations of this order which have a continuous history extending over thirty or forty years, and which have undoubtedly been of great service to the agricultural classes. The benefit of such societies is perhaps most obvious to small farmers, who only require to buy supplies, such as manures, seeds, and implements in small quantities. By purchasing direct from the manufacturer and selling at a trifle above cost price a Co-operative Society enables a small farmer to procure his goods at a much more moderate price than would be possible if he purchased on his own account from local dealers. He obtains the benefit of lower rates of carriage, and is assured by guarantee of the genuineness of his goods.

The benefit to a large farmer is equally great, though for a less obvious reason. The quality of manures and feeding stuffs can practically only be tested by analysis, and even then some scientific knowledge is requisite to appreciate the results obtained and the relation between the price charged and the value represented by the analysis. By joining a Co-operative Society a farmer is assured not only that he is paying the proper market price, but also that he is getting a genuine article for his money, for it cannot be to a Society's interest to cheat its own members.

Societies for the Sale of Agricultural Produce.—Societies for the sale of produce are chiefly of benefit to small farmers and persons who confine their attention to a few kinds of agricultural produce. They are certainly also useful to those extensively occupied in mixed farming, though it is chiefly among dairy farmers that societies for the sale of produce find their members. It is well known that in Denmark, where large quantities of milk are made into butter for the foreign market, the dairy farmers have formed Co-operative Societies in order to secure not only economy in manufacture, but also that uniformity of quality which has enabled them to displace their rivals. Small holders who desire to sell their produce in the market will find membership of a well-managed Co-operative Society an enormous advantage, inasmuch as they will be saved the trouble and expense of marketing their goods, and will be able to devote the time so saved to the cultivation of their holding. A double saving is thus secured. It must not be supposed, however, that the Society for purchase cannot also be a Society for sale. It is useful to begin with the former class of business and proceed to the latter as the Society progresses and prospers.

The secret of success of all co-operative trading, however, is solidarity of union. Every member of a Society who undertakes to sell his produce at the Society's store or depot should be bound to offer all his produce if wanted, or, at any rate, the best he has. If he tries to sell his best produce privately and only sends his inferior stuff to the store he is acting against the interest of the Society and may bring about its downfall, since no customer will go to a store where only second-rate goods are to be bought when better produce is on sale elsewhere. This point cannot be too

strongly insisted upon, and should form one of the rules of every Society that is formed.

The second point is that profits should be divided in proportion to trade done, and not to capital invested. There are many societies formed on joint stock lines in England with which farmers usefully and profitably trade, but these are not Co-operative Societies in the true sense of the word, and small local societies should not be formed on these lines. If profits are divided according to trade done every member has an additional inducement to support the Society by his custom.

Finally, it is advisable that societies should not attempt too extensive a business at the beginning. Small societies may be formed for the purpose of dealing in one class of produce. It is usually advisable to begin in this way, and to extend the business as trade grows. It tends to greater security, and is less likely to rouse the hostility of other local traders.

The Care of Farm Implements.

If it were possible to compute the value of implements that are allowed to go to wreck on a farm by exposure to the weather it would be found (says "Aratrum," in the "New Zealand Farmer") to amount to such a substantial figure that it might cause farmers to consider their share of the waste that is going on before their eyes. Take a reaper and binder. There is no reason why it should not harvest 100 to 200 acres per annum for 15 or 20 years, and then be in good order, except breakages through accidents; whereas, largely through being left exposed to the weather, it is rare to see a machine after having been on the farm 10 years doing good work. The same remarks apply to tools, vehicles, and implements of all kinds that go to make up the requirement of the farm. Next to shelter for the animals a roomy, conveniently constructed implement and toolhouse should be the chief structures on the farmsteading. Owing at times to scarcity of cash, when a man starts farming on unimproved land, he is apt to start by building as little as possible—just sufficient to protect one or two of the more expensive machines—which is a laudable proceeding, so far as it goes. But the result is often seen of there being a number of small, poky sheds so constructed that it takes two or three men to put a machine into them, so that, although the machine may be taken to the steading when the job is finished, it may have to stand outside for days, often until saturated with rain, waiting for the chance of two or three to congregate that feel inclined to shift it into the shed; whereas if a proper shed is erected, into which any machine can be taken in with the team, there is no time lost, and the risk of exposure is avoided; besides, when the machine comes to be again wanted, one man can get it out and go to work. By having such a shed, where all the implements and tools are in their allotted space, there is plenty of room to get around each one to clean and see that there is no screw loose—one little screw loose often means ruination to the article when it is put to work.

South-African Wool and the Wool Market.

The following report of Messrs. Buxton Ronald & Co., of London, on the wool market will be appreciated by those interested in wool:—The closing weeks of 1909 found the wool market in good spirits, and in place of that disinclination on the part of users and others to enter into, or

consider, new business, which at the end of the year, with its attendant balancing of books and stock taking, is only natural, there was general activity, with many buyers in evidence. Crossbred wools in particular were very much wanted, supplies having run rather short, and even in merinos, with stocks in large compass, there was an excellent demand. Germany it is true gave slightly pessimistic reports of business, but in France trade was good, and in Yorkshire there was every reason for satisfaction, in addition the American demand, especially for medium crossbreds, was very keen. These market conditions promised good things for the first series of sales, which commenced here on the 18th January, and happily there were no disappointments. The attendance of buyers was perhaps larger than usual at the auctions, and there was very keen competition. Merinos of really fine quality moved up about a good 5 per cent. from November, those of average fineness being firm and the harsher, broader sorts rather easier. Fine crossbreds were about stationary, and on medium and coarse qualities there was an improvement of about $7\frac{1}{2}$ per cent. 178,300 bales were catalogued, and of these 9,200 bales were from South Africa. The selection all round was very attractive.

Turning to South Africans, the highest price paid was $13\frac{1}{2}$ d. for a small lot of Mossel Bay wool marked DR. This was an excellent clip, the bulk selling at $1s. \frac{1}{2}$ d. per lb. The wool from this district handled very nicely, being of very good quality, but, as we have remarked on former occasions, both they and other Western Provinces are lacking in length. Other clips of less merit went up to 11d. and $11\frac{1}{2}$ d. These figures were also obtained for Caledon Wools, and the lower lots made from $9\frac{1}{2}$ d. to $10\frac{1}{2}$ d., being very firm on December's best prices. There were some particularly well prepared wools from Bedford and Adelaide, which it was satisfactory to note came in for their full share of attention. Up to $11\frac{1}{2}$ d. was paid for the lightest, and $9\frac{1}{2}$ d. to $10\frac{1}{2}$ d. for the more wasty lines. Kaffrarians were nothing out of the common, selling firm from $9\frac{1}{2}$ d. to $10\frac{1}{2}$ d. There were some well graded clips from the Orange River Colony, and these, having been on the market now regularly for a year or two, are getting known, and sell readily in consequence; $9\frac{1}{2}$ d. to 11d. was the range of price. A line from Bethlehem was something fresh, but we cannot help thinking that these, and other clips, should be always catalogued under owners' or farms' names, as under one forwarding mark they lose their identity. Natal was not really represented, but there was a good quantity of East Griqualands with rather more length than usual, but with plenty of skirt, and these sold up to 10d. per lb.

Short supers were much in demand. Good Kaffrarians sold in the neighbourhood of $8\frac{1}{2}$ d. to $9\frac{1}{2}$ d., and the same for Westerns, and short wasty East Londons from $6\frac{1}{2}$ d. to $7\frac{1}{2}$ d. Scoureds met an excellent market, Western Paarl's made up to 2s. per lb., and some bulky Port Elizabeths, with a little seed, up to $1s. 11\frac{1}{2}$ d. Short East Londons with some quality and colour sold remarkably well up to $1s. 11d.$ All of these show a good 5 per cent. advance. Blacks were only in fair demand. Coarse whites went from $1s. 1d.$ to $1s. 2d.$, according to quality. Coarse and coloured were slow of sale. The foregoing results, we think, may be considered highly satisfactory, as wool is at a high level of value. We are also glad to note an increase in the number of clips coming into this market properly skirted and prepared, and being sold on growers' account. With a continuation of this method, it surely cannot be long before South

African wools take their proper place in the wool world. The next sales commence here on the 8th March, and bearing in mind the genuinely large consumption which is going on, and likely to continue, there seems every probability of prices being maintained.

In this connection the following letter, received by Messrs. Pringle Bros., of Glenthorn, Mancazana, from their agents at Adelaide, C.C., ament their Rambouillet merino wool, shipped by them for sale on the London Market, may also be of interest to readers: "Sirs,—We have pleasure in advising you that your clip of wool was sold in London on the 26th January and realised the following prices:—

5 Bales Special Long Wool, 11½d.; 23 bales Long Wool, 11d.; 8 bales Nine Months' Wool, 10½d.; 3 bales Rams Wool, 9½d.; 2 bales Bellies, 8½d.; 3 bales Locks, 6½d.; 1 bale Locks, 6d.; 6 bales Lambs Wool, 9d.; 1 bale Lambs Locks, 6½d. We trust these prices will be to your entire satisfaction and would point out for your information that the five bales Special, sold at 11½d., after deducting all expenses means that you have secured a trifle over 10d. per lb. clear, which constitutes a record price for any wool sold in this or adjoining districts this season. Our London friends write that they deem it wise to advise that during the inspection of the wools up for sale in London on the 26th ult. it was obvious that Pringle Bros. Glenthorns clip was of superior nature to that of the other clips on the show. It was the remark of several buyers that they wished all South African wool would be classed in this way and the satisfactory prices obtained for the clip should be an object lesson to our farmers. We are firmly of opinion that the "Protona" Packs have proved their worth and have had a lot to do with the improved prices we have secured for wool packed therein."

Export of Fruit to Rhodesia.

In connection with the export of fruit to Rhodesia, the Department of Agriculture is advised by the Director of Agriculture, Salisbury, that it will be of considerable assistance to examining officers and consignees if exporters of fruit for introduction into Southern Rhodesia mark clearly on the outside of the cases the kind of fruit contained therein, *e.g.*, "Plums," "Pears," "Grapes," etc., otherwise considerable loss of time in examination on arrival is occasioned, as the Inspector has to open each case to ascertain the contents thereof, and it is trusted that shippers of fruit will bear this suggestion carefully in mind.

London Ostrich Feathers Sales.

The London February Sales of ostrich feathers, which commenced on the 7th and concluded on the 11th of that month, comprised 4,683 cases Cape and 132 cases of Egyptian, of which about 4,610 cases Cape and 121 cases Egyptian sold: The weight of feathers offered was 110,000 lbs. against 119,000 lbs. in December, and 114,500 in October last. There was a large attendance of buyers and a good demand for all good qualities which met with active competition, prices being fully maintained, but inferior qualities were not so much in request and sold irregularly, and in some instances in favour of buyers. Egyptian met with fair competition and sold with the same changes as Cape. The quantity sold realised about £269,000.

DRY LAND FARMING.

EXPERIMENTS AT KLIPBOSCHLAAGTE EXPERIMENT STATION, ROBERTSON.*

REPORT No. 1.

By R. W. THORNTON, Government Agriculturist.

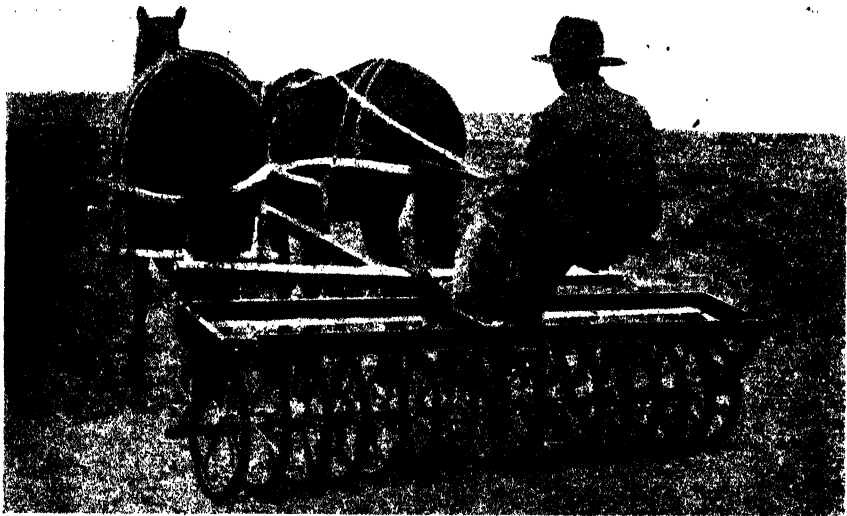
Dry land farming has been in practice for a considerable time in America, but it is only recently that it has been seriously considered by the South African farmer.

The main problems which the "dry land" farmer has to consider are, first, the capturing of all available moisture, and second, conserving this moisture in the soil.

To carry into effect the first point—that of capturing all available moisture—the land must be terraced and levelled where necessary to prevent "run off" during heavy rains and to ensure an absolutely even distribution of moisture over the whole area worked. The second point, that of conserving the moisture when captured, is effected by deep and thorough cultivation. By "thorough" cultivation is meant the reduction of the soil to the best possible physical condition, or the division of the soil into fine separate particles. To demonstrate the importance of this point it will be as well to explain both how soil moisture is held and lost. Before we can conserve the moisture in the soil it is necessary to understand the manner in which it is held by the soil. There are three types of soil moisture, but the one which most concerns the "dry land" farmer is the capillary moisture. This exists in the soil in the form of a film of moisture round every soil particle, and thus it stands to reason that the more finely divided the particles of soil are the greater the total area of this film of moisture. For example, a cubic foot of solid stone gives a far smaller total surface than if a cubic foot were divided into ten parts; hence the more the division the greater the amount of moisture held. For this reason it is necessary to have the soil reduced to the finest tilth, *i.e.*, into the smallest particles possible, and these fine particles should extend as deep as possible; hence the necessity of deep ploughing. The best illustration that can be given of the holding of moisture by soil particles,—which holding of moisture is expressed by the term "surface tension"—is that of taking a stone and dipping it into water. When it is removed it is wet, that is the film of moisture adhering is held in the pores, whereas a new polished knife dipped into water and removed presents an entirely different appearance.

* N.B.—Rainfall 10·077 inches for year 1909.

This soil moisture under the influence exerted by the rays of the sun on the surface layer of the soil is constantly flowing up to the surface and is there vaporised and lost to the soil. To prevent this loss it is necessary to cause a break in the flow; this can be done most thoroughly by mulching. The best but least practical mulch is that of covering the soil with a layer of straw or like material, the practical dry farming method being to cover the surface of the land by constant cultivation with a layer of fine, loose, dry earth. The sun still continues its action as before, namely, that of drawing moisture from and through the subsoil, with this difference, that the capillary flow is broken near the surface by the loose cultivated surface layer, thus destroying the direct current and preventing surface evaporation to a great extent. Most of us have noticed a few days after rain how dry the surface of a path is, yet if we happen to turn over a flat stone or a bunch of straw or dry grass we see how moist the ground covered



Subsurface Packer ready for use.

by them is. The stones and straw, like loose cultivated soil, act in a similar fashion by closing the pores of the soil. The check to evaporation, like the moisture-holding capacity of a soil, differs to a great degree according to the texture of the soil. The finer soils not only hold the greatest quantity of water per cubic foot but retain this moisture longer than coarser ones, so in selecting land for "dry land cultivation" it is very necessary to take the texture of the soil into consideration. A soil high in organic matter (humus) is excellent, provided all other conditions are equal. The subsoil must be seriously considered if success is to be expected from this method of farming, for it is necessary to have a subsoil which allows of the quick and easy upward flow of water, as in dry land farming water is also brought into requisition which is lying in the deeper levels of the soil. With care and energy dry land farming can undoubtedly be carried out successfully in many parts of the Colony. In Montana, U.S.A., large crops are produced, for instance 40 to 58 bushels of wheat, two tons of lucerne hay and 20 muids of oats, per acre, with only an average rainfall of 13 to 15 inches.

The land was prepared for the dry land farming in 1908, and the experiments with white crops, lucerne, mealies and potatoes were conducted during the past season at Klipboschlaagte in the Robertson district under the supervision of Mr. E. A. Visser, Manager of the Robertson Experiment Station.

These experiments, with a rainfall of 10·077 inches for the year, proved successful.

This report, however, deals only with the wheat experiment. During the period between the sowing and the reaping of this crop, the total rainfall gauged was 3·55 inches, not equal to a single wetting as given by the average farmer. The rainfall was distributed as follows:—

July, ·35; August, 1·21; September, ·96; October, 1·04; November, Nil; and fell in twelve different light showers averaging just over ·29 per shower, which, under ordinary conditions, would have been of very little practical value.

The accompanying illustrations will give some idea of what was produced. They represent specimen ears of Gluyas Early wheat taken from the several experimental plots and numbered accordingly.

One of the chief implements used in this system is known as a subsurface packer. As seen by the illustration, it consists of a number of wheels having a triangular shaped rim, the apex being on the outside. These wheels are a little distance apart. When run over the land its action is as follows:—The wheels go into the ground, having the same effect as a roller, with this difference that, when passing on, the loose soil falls into the depression made, leaving the surface mulch intact. This packing of the soil tends to allow the soil moisture to rise more rapidly from below up to the part packed, which is the region where the roots of the plant feed. The mulch on the surface remaining intact, prevents the moisture rising to the level of the surface where it would vaporise and be lost. Many farmers will have noticed how the soil falls back into the wheel track of a wagon crossing newly ploughed damp land. Some days after if this soil that has fallen in and dried off is removed it discloses the smooth damp surface of the actual track. This is not unlike the action of the sub-surface packer.

The following are the details of the experiment:—An area of 21·1 acres of new ground was broken up and levelled off, after which it was again ploughed to a depth of 9 to 12 inches in December, 1908. After every rain the ground was well harrowed to break up the crust formed on the surface and to kill any weeds which might have grown up. Weeds growing on a fallow reduce the moisture considerably and so must be kept under. This system of 6 to 12 months fallow is one of the principal features, in dry farming recommended by Campbell. It allows of the better preparation of the seed bed and also a longer time for storing water for the use of the future crop. In July 1909 the ground was again ploughed and well harrowed, when the following series of experiments was conducted with Early Gluyas wheat;—all the seedings given being at per acre:—

Series A.

Plot No. 1. Campbell subsurface packer was run over the ground (drawn by two horses), 80 lbs. seed sown broadcast and harrowed under.

Plot No. 2. Repetition of No. 1, but 40 lbs. seed were sown broadcast.

Plot No. 3. Subsurface packer used and 56 lbs. seed drilled 8 inches apart with the Superior Drill.

Plot No. 4. Subsurface packer used and 28 lbs. seed drilled 8 inches apart.



Plot No. 1.

Plot No. 2.

Plot No. 3.



Plot No. 4.

Plot No. 5.

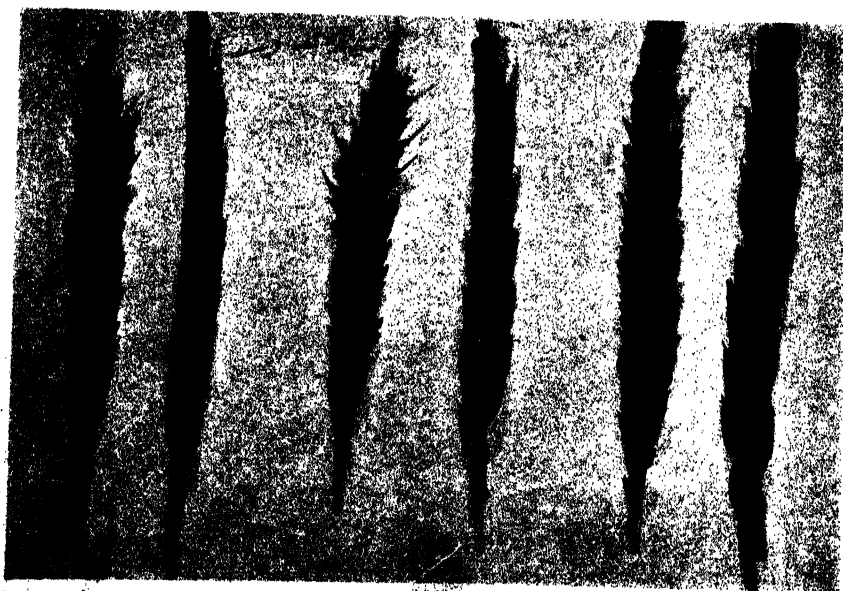
Plot No. 6.



Plot No. 7.

Plot No. 8.

Plot No. 9.



Plot No. 10.

Plot No. 11.

Plot No. 12.



Plot No. 13.

Plot No. 14.



Plot No. 15.

Plot No. 16.

Plot No. 5. Subsurface packer used and 12 lbs. seed drilled 24 inches apart. These drills were then cultivated after every rain with a spike tooth cultivator until the wheat reached the stage to prevent further cultivation.

Plot No. 6. Repetition of No. 5 with only 11 lbs. wheat drilled 24 inches apart.

Plot No. 7. The same as No. 3 only that 42 lbs. seed were sown to the acre as is usual in ordinary crops under irrigation at the Robertson Experiment Station.

Plot No. 8. Subsurface packer was used and 28 lbs. seed drilled 8 inches apart. This plot was subsoiled.

Series B.

Plots Nos. 9—16. Another eight plots were laid down in the same manner as series A, with the difference that the subsurface packer was not used.

Plot No. 17. A control plot under irrigation at the Robertson Experiment Station, some three miles distant but in similar soil, was treated in the ordinary way and received a total of 24 inches of water, 24 lbs. of seed being sown per acre in drills 8 inches apart. The seed was sown on all the above plots on the 7th July, 1909, and all crops were harvested on the 23rd November, 1909.

The following table shows the preparation of the ground, method of sowing and amount of seed sown and weights of crop.

DRY CULTIVATION EXPERIMENT WITH WHEAT AT KLIPBOSCHLAAGTE.

Plot.	Treatment of Soil before Sowing.	Method of Sowing.	Quantity of Seed sown per acre.	Weight of Crop in lbs. per acre.				
				In field	1st.	2nd.	Total Grain.	Straw and Chaff.
A 1	Ploughed, harrowed, subsurface packed	Broadcast	80	520	68	80	148	372
2	do. do.	do.	40	1,180	160	120	280	900
3	do. do.	Drilled 8"	56	740	188	41	232	508
4	do. do.	do. 8"	28	1,308	348	128	476	832
5	do. do.	do. 24"	12	380	72	4	76	304
6	do. do.	do. 24"	11	1,096	224	128	352	744
7	do. do.	do. 8"	42	736	200	80	280	456
8	Ploughed, harrowed, subsoiled, subsur- face packed.	do. 8"	28	1,340	328	112	440	900
B 9	Ploughed and harrowed	Broadcast	80	460	100	60	160	300
10	do. do.	do.	40	536	116	48	164	372
11	do. do.	Drilled 8"	56	776	292	92	384	392
12	do. do.	do. 8"	28	648	108	72	180	468
13	do. do.	do. 24"	12	360	60	40	100	260
14	do. do.	do. 24"	11	320	40	28	68	252
15	do. do.	do. 8"	42	732	180	68	248	484
16	Ploughed, harrowed, subsoiled.	do. 8"	28	796	168	96	264	532
17	Control plot under irrigation received 24" of water.	do. 8"	42	1,950	170	110	280	1,670

The yields from the plots are small, this being due to the destruction caused by a heavy wind, but as each plot suffered it does not alter the comparative value of the experiment. This land received no fertiliser. Another thing which would tend to reduce the yield was the lateness of sowing, as April is the usual month for sowing cereals in the Robertson district, but this could not be done owing to pressure of work in other directions.

In comparing the plots shewn in the table, we find that on an average the increased yield due to the use of the Subsurface packer is greater by 45·8 per cent.

Average of 8 plots Subsurface packed	285·5 lbs.
Average of 8 plots Subsurface packer <i>not</i> used	196 lbs.
Increase due to use of Subsurface packer	89·5 lbs.

It is quite evident from the tabulated results that a seeding of from 28 to 30 lbs. is likely to prove the most economical and gives the best results.

The plots of Series A compare very favourably with plot 17 which received the heavy waterings.

The two plots which were subsoiled, i.e. Nos. 8 and 16, have both given yields topped by but one plot. This shews the advantage derived from subsoiling, which increases the area of the moisture-holding reservoir, also permits the air to penetrate and so assist the bacteria working in the soil.

SCAB LEGISLATION UNDER UNION.

AN EFFORT AT FINALITY.

THE BLOCK SYSTEM ADVOCATED.

By A. G. DAVISON, Chief Inspector of Sheep.

In view of the fact that the Union of the Cape Colony, Natal, the Orange River Colony and the Transvaal, will in a few months be finally accomplished, it may be advisable to anticipate matters, and raise the question (from a farmer's point of view) regarding the character of Scab legislation, which may be introduced after Union has been effected.

In connection with this, the most important point appears to be, whether one law will be passed, which will be applicable to all the States concerned, or whether each State will be left a free hand to frame its own scab laws. Some may favour the former course, whilst others again may deem it advisable that each State should be responsible for its own measures for the eradication of Scab. Many again, may be sceptical as to whether an Act could be framed, which might be applied to all parts of a country which differs in its climatic conditions to such an extent, as the Union of South Africa. However widely opinions in this respect may differ I am strongly in favour of one law for the whole country, and feel just as strongly that no harm can be done by the endeavour to sketch the frame work of an Act which might be applied in the manner indicated. When we take into consideration the various laws for the eradication of scab, which are at the present time in existence, the manner in which these differ one from the other, and the dissimilarity of the regulations which have been framed to control the removal of sheep from one State to another, it will, I think be conceded that some assimilation is not only necessary in the interests of all concerned, but that such assimilation has now become imperative.

No one can consistently condemn legislation which is enacted to protect one part of the country, in which an effective law may be enforced for the eradication of scab, to prevent the disease being introduced from another part, in which the laws may be less drastic. Protection, in such a case, is imperative, and although the protective regulations may prove irritating and oppressive to some, the difficulty can easily be removed by the weaker and less effective laws being strengthened until they are placed on an equality with those in force in the neighbouring State. It thus becomes a matter of urgency that the unification of our scab laws, as well as the regulations which govern the removal of sheep from one part of the country to another, be taken in hand as soon as possible, and every portion of the country placed as far as practicable on an equal basis as regards the legislation for the eradication of scab.

In the August edition of the *Agricultural Journal* for 1899, I contributed an article on the scab laws at that time in existence in the several States now to be united, and thus, ten years ago, attention was

drawn to the necessity for unifying the different laws on scab eradication, as the following extract will show:—

"I have already drawn attention to the fact that it is a matter of importance that all the laws at present in force (or which may be framed in the future) for the eradication of scab in South Africa should be assimilated as far as climatic conditions and the feelings of the people will allow. For any such purpose it would be necessary to call a conference of delegates representing the several States and Colonies interested in the subject. At this Conference the ground work of any general scheme for the eradication of scab could be discussed and as far as practicable a mutual understanding arrived at respecting the main details which it would be necessary to incorporate, and which would be generally adopted by the several Governments represented."

In order to do justice to all sections of the farming population who are effected by scab legislation, it will be my endeavour to look at the question, not only from the vantage ground of those who desire to see the disease eradicated, but also from the standpoint of others, who are partly or wholly indifferent, as to whether scab exists among their flocks or not. That there are many difficulties in the task I am undertaking is freely admitted, and possibly none are better acquainted with these obstacles than those who have for the past two-and-twenty years been engaged in combating them.

I am in hope, however, that others equally interested in the question of scab eradication will also contribute by giving their experience and opinions on a matter of such vital importance to sheep farmers throughout the country, so that some reasonable and adequate solution of the problem may be forthcoming.

In dealing with the subject there are many different phases of the question to be taken into consideration. For instance, there is the stock owner who resides in the coast belt, with a mild humid climate, which, although it conduces to the spread of the disease, at the same time renders it possible to treat the flocks by dipping without the least danger during the winter months.

Again there are the farmers who reside in what may be termed the Alpine regions, where the cold is intense during the winter, at an altitude of from six to eight thousand feet above sea level. In this part the weather is at times so severe that systematic dipping can only be carried out during the early part of the day when it is bright and warm. Again there are the districts to be taken into consideration in which the rainfall varies from twenty to thirty inches during the course of the year and the dry arid tracts, where from two to six inches of rain is the annual fall. There is the farmer who looks upon an outbreak of scab among his flocks as perhaps the greatest scourge which could befall him, and which means the loss in a direct, as well as an indirect manner of hundreds of pounds, and there is the stock owner, who, considering the disease as a persistent and expected visitor, never dreams of taking precautions to prevent the intruder trespassing on his farm.

There is the farmer, who, believing that scab can be stamped out, acts up to this belief and uses every effort to keep his flocks clean, and there is the man who, having been reared in an atmosphere of doubt and incredulity, and labouring under the impression that the scourge must appear with the advent of drought, loss of condition and other evils common to the lot of all farmers, neglects to take the most ordinary precautions to deal with the pest. Among this latter class the conviction is strongly implanted that with rain and improvement of the veld the sheep, however badly diseased, will, as a natural consequence, throw off scab and regain health without any treatment or interference on the part of the owner.

With such a combination of difficulties to face, with the urgent call from one side for more stringent legislation, whilst from the other the cry comes for relaxation and concessions, the position becomes more difficult to face the longer it is delayed. It can hardly be a matter of surprise, under the conditions mentioned, that the war waged against scab during twenty odd years with what cannot be termed other than antiquated weapons has failed to make much impression on the enemy.

Before commencing with a sketch of the proposed legislation I wish in the first place to deal with the scab laws which were in operation between 1887 and 1895, and the results which have been attained during the past two and twenty years. Secondly to briefly consider the defects of the said legislation and then pass on to the remedies which I consider should be applied in the future.

In the first place let us glance at the state of the stock in that part of the Colony in which the Act of 1886 was proclaimed. In this portion, comprising twenty-six districts, the feeling was by no means general in favour of scab legislation, for there existed from the enforcement of the law and even up to the time that the compulsory Act was proclaimed, strong and bitter opposition on the part of a fairly numerous section of the farming population. This opposition, although of a passive nature, proved exceedingly difficult to deal with, for it not only created endless obstacles, but was the cause of much unrest and continued agitation against the provisions of a law which was of the mildest possible type. Prior to 1887 it was the exception to find a clean flock and it was equally the exception for such a flock to remain free from scab for longer than three months. Infected stock were freely and continually brought for sale to public centres and moved about the country to the annoyance and detriment of those who were anxious to keep their sheep clean. When the Act of 1894 came into operation it might be said that it was the exception to find scab in by far the larger portion of the part referred to and the farmer who continued to breed the pest, or who did not immediately stamp out the disease when it appeared among his flocks, was a marked man in the community in which he resided. It seldom happened that infected stock was brought to public sales, or was driven along main roads, and when this did occur, the fact was immediately reported to the Inspector. Those who maintain that no improvement was effected by the enforcement of the scab laws of 1886 and 1888, are apt to overlook the above facts, and, judging by their present surroundings, forget the condition with which they were at one time accustomed. Again an enormous amount of ground work and foundation for more stringent legislation was laid. Hundreds of dipping tanks were constructed and generally speaking education in matters relating to scab and its treatment progressed favourably. The Scab Acts of 1886 and '88 were productive of much good in another direction, for owing to the prevalence of the disease, farmers, with few exceptions, were compelled to shear their sheep twice during the twelve months, and thus there was always an enormous quantity of badly grown short wool thrown on the market. Skins too, were depreciated in value owing to the ravages of the scourges and large portions of every consignment sent to the sea ports were rejected on this account. At the close of 1894 the position had entirely altered in the districts in which the earlier Acts were in operation, clips of wool of less than twelve months growth were seldom heard of (excepting when grown by native owners), skins were vastly improved in value, and the wool forwarded from districts inhabited by natives was in great demand, on account of its freedom from scab. If anyone maintains that the expenditure incurred through the administration of the scab laws has been money wasted, let him pause and consider the position of the sheep farmer

in the country prior to 1887 as compared with that which existed at the commencement of 1895.

The laws of 1894 and 1899, although they have certainly not proved as effective as those of 1886 en '88, have at the same time caused reform in many directions. In those parts in which the first legislation was introduced, the disease has in some districts almost entirely disappeared, and had adequate protection been afforded, a large tract of the Eastern Province would at the present time have been entirely free from scab. In those districts which adjoined, or were situated near the area in which the first laws were enforced, the stock owners were more or less prepared for scab legislation and when the general Act superseded the permissive law, little or no trouble was experienced by the Inspectors in the performance of their duties. If, however, the whole of the Colony proper is taken into consideration the results as they appear to-day, are certainly not what might have, with reason, been expected. Passive opposition is still offered in a large portion of the country and stock owners have not accorded that co-operation which is one of the essentials to success. Thus the disease is still exceedingly prevalent in a good many districts and will continue to be in the ascendant until a more united and determined front is shown in the fight against the pest. In summer after the dipping of the flocks the wave of scab recedes, only to sweep up again with increased virulence as the winter passes into early spring, when high water mark is reached and the percentage of scab attains the maximum.

In reviewing the past in the light of to-day, it would appear that the enforcement of the general act was somewhat premature and that it would have been a wiser policy to extend the operations of the law by gradual steps and thus have accustomed stock owners to the provisions of an act, which to many was the essence of all that was objectionable and arbitrary.

Secondly:—It would be absurd for anyone to deny that some beneficial results have not been attained during the past fifteen years, a period interrupted by war and disastrous droughts, for even the most casual observer must admit that a certain amount of educational progress has been made. In many districts the disease has been reduced to a minimum and those who have cleaned their flocks now demand protection from re-infection. This protection, however, is not adequately provided for in our legislation and hence work accomplished by the careful farmer is often undone by the neglect of others. It is this lack of protection that causes many stock owners to look upon the scab acts as defective and urge the repeal of the laws, which are complied with by some and openly opposed by others. The absence of the necessary protection is I think one of the weakest points in our legislation. We build up with the one hand, only to break down the structure erected at great expense and labour, with the other. Ground is gained every summer, only to be lost again during the winter. Can this be a matter of surprise when we consider the anomalies of a law which compels the cleansing of stock under certain pains and penalties and allows the disease to be spread from farm to farm and from district to district by the removal of infected sheep under no less than four different sections? No one part of the country is safe from the invasion of diseased stock which the law permits and sanctions to be removed. Again, the Act which provides for the cleansing of sheep does not compel the farmer to destroy or disinfect the infected premises in, or on which the diseased flock has been kept. The Inspector is permitted under certain conditions to undertake the cleansing of stock, but dare not, unless with the permission of the owner, attempt the treatment of the kraals. These are sanctuaries for the preservation of the Scab mite, incubators for the propagation of the species and a prolific source of infection

for the future. Another fruitful method for spreading the disease is to be found in the removal of infected sheep from one farm to another for the purpose of dipping, for no owner can be compelled to construct a tank on his own farm in which to treat his sheep, provided he can obtain from his neighbour the right to use his tank. It might be thought that the man who had cleansed his sheep and farm from scab, would naturally object to infected sheep being driven over his ground to be dipped. In this matter, however, sentiment plays no mean part, and many a farmer would rather suffer loss in this respect than offend his neighbour by refusing the use of his dipping appliances.

Again the privilege accorded to the farmer or speculator to issue his own pass for the removal of sheep has during the past been the means of spreading the disease far and wide, and it is only necessary to quote a few figures from my annual reports to show how grossly the liberal provisions embodied in the Act have been abused. For instance, among one hundred and twenty-six infected flocks removed during last year into six of the Midland Districts, no less than one hundred and twenty were removed by owners who had granted their own passes. During 1907, ninety-one infected flocks were introduced into the division of Oudtshoorn and seventy-six of these were brought in under owners' passes. It may be deemed an exaggeration when I state that quite three-fourths of the flocks which have been infected during any winter and declared as clean by the inspector at the close of the year, have never been thoroughly cleansed. The usual course adopted when an outbreak of scab occurs, is to place the infected sheep in quarantine and if the stock do not show visible signs of disease when the period allowed expires, the order is cancelled, and the owner is at liberty to move his stock to any part of the country on his own certificate. Now, as I have already mentioned, quite 75 per cent. of the stock thus released from quarantine have never been cleansed, for scab has only been suppressed and is certain to appear again in a few weeks' time. I maintain that no flock or farm should be declared as clean until at least three months have elapsed since the last signs of disease were noticed.

Lastly, the formation of Scab Boards in each District, and the power given to these bodies to nominate men for the position of sheep inspector has not proved a success. True, in some districts in which the stock owners are in favour of the eradication of scab, good men have been recommended, but in a large part of the Colony the nominations have been anything but satisfactory. In many instances the officers appointed have had to serve a lengthy apprenticeship at the expense of the country, and in the end have frequently proved failures.

Thirdly, as regards the remedies which should be adopted in future legislation, I have already mentioned that these should be of a sufficiently elastic nature to prove adaptable to all parts of the country. The difficulty then is to secure the required elasticity, necessary to meet every emergency as it may arise, and at the same time not impair the general efficiency of the law in any material manner. These considerations, I believe, would be secured if the cleansing of the flocks was undertaken in sections or groups of districts, a system which I have advocated since 1897, and by which I am firmly convinced the desired end will be attained in a much shorter time, as well as in a more economical manner, than by any other method which has hitherto been adopted or suggested. My reasons for advocating this system for the eradication of scab in preference to other methods, are, because in the first place a small area can be treated in a much more thorough manner than a large extent of country. When the fact is taken into consideration that in treating the stock of the Cape Colony alone some 276,995 square miles of territory and over 27 million sheep and goats have to be dealt with, it will be admitted that the undertaking is not only a large one, but one which will require unlimited tact,

skill and powers of organisation. In the second place it would be impossible to secure a sufficient number of trained and competent men to administer the Act with any degree of success in all parts of the Colony at the same time. We could, doubtless, persevere in our present work by amending the laws now in force, so as to remedy the weak points. We might throw the responsibility of cleansing infected stock solely upon the owners of the same, or provide for the dipping of scabby stock under competent supervision. All this, it is true, might be effected, but only at considerable expense and loss of time, and we would probably fail to secure the co-operation of the farmers in a large part of the country, who, as they are opposed to the present milk and water legislation, would naturally object to more stringent measures being adopted. In attacking the scab mite by means of the Block system, there are certain lines which must be followed if success is to be attained. To neglect these would prove disastrous. Failure to eradicate the disease, owing to defects in the law, framed for that purpose, weakness in the administration, or carelessness or ignorance on the part of those who are appointed to supervise the work of scab eradication, would have a most detrimental effect, especially on those who are at present opposed to such a law, and who maintain that scab cannot, and never will be eradicated. If the question is attacked with the determination to conquer the disease and eradicate it once and for ever, then the greatest care must be exercised in framing the measures to be adopted so as to guard against any weak points or flaws in the legislation, and to ensure that every compartment is water-tight and leakage carefully avoided. What is really required is a law containing the minimum number of sections possible, combined with the highest degree of common sense which can be secured.

My suggestion is that the whole Colony be divided into four sections or blocks. The partition of the country into these blocks would no doubt prove a difficult matter, but the question is certainly not insoluble, and if due attention is paid to the ordinary trade routes and markets, but little inconvenience would be experienced by those who are included in the first area or block to be attacked. The following division of the Colony is suggested as one which might suit all requirements:

Block No. I. to consist of all districts east of, and inclusive of, the following divisions:—Albert, Steynsburg, Middelburg, Graaff-Reinet, Murraysburg, Aberdeen, Willowmore, Uniondale, and Knysna. In this area there would be approximately 89,218 flocks containing 14,736,496 sheep and goats.

Block No. II. to include Bechuanaland, and the divisions of:—Barkly West, Britstown, Colesberg, Hanover, Hay, Herbert, Hopetown, Kimberley, Philipstown, Prieska, Richmond, and Victoria West, in which area there would be 11,633 flocks with a total of 5,714,203 sheep and goats.

Block No. III. to consist of the following divisions:—Calvinia, Carnarvon, Clanwilliam, Fraserburg, Kenhardt, Namaqualand, and Van Rhynsdorp, the small stock in this area totalling 5,192 flocks and 2,281,183 sheep and goats.

Block No. IV. to include the South-western districts bounded by and inclusive of Piquetberg, Ceres, Sutherland, Beaufort West, Prince Albert, Oudtshoorn, and George, which area would contain 7,774 flocks and 3,509,394 small stock.

One great advantage to be derived from the partition of the Colony would be, that whilst cleansing operations are being carried out in the first Block attacked, the farmers residing in the remainder of the country would be to a certain extent prepared for the cleansing of their flocks, when the time arrived for the assault to be pushed home in the remaining

blocks. Thus, we might reasonably expect that instead of opposition, a more cordial feeling would exist and greater co-operation accorded, than was experienced when the Act of 1894 was enforced. A further, and by no means unimportant advantage, is also to be gained by the adoption of the block system, and that is, the possibility of securing the services of trained and experienced men, when the attack has to be most fiercely made. In the first block in which cleansing operations are commenced, all the best men available should be concentrated. Thus, when the second block was to be assaulted, there would be an experienced staff ready for transfer when the proper time arrived, and this would be repeated until each block has been cleansed. It is mainly this consideration which has led me to carve out the first block from the Eastern and Midland districts, and to frame it of such a size, that when the area has once been cleansed, there would be sufficient trained men available to commence work in the second block, and at the same time to permit of the required number remaining to guard against, and stamp out any outbreak of disease which might possibly occur. As I have already mentioned, this is by no means an unimportant consideration, for I am convinced that the value of such a trained and experienced staff cannot be overestimated. One of the faults of the past has been the idea that any man, who has the least knowledge of farming matters, and at times no experience at all, could be turned into a ready-made inspector capable of instructing and guiding others at very short notice. I trust that no such delusion will be held in the future, but that the services of the best men available will be secured, even though the expenditure incurred may be heavy.

The main lines in which the legislation necessary for the working of the Block system should be framed are as follows:—

- (a) The appointment of all officers to administer the Scab Act to be left entirely in the hands of the Minister who is responsible for the administration of the law.
- (b) The cleansing of all scabby flocks, as well as the treatment of infected kraals, premises, and sleeping places, to be carried out by, or under the supervision of, the officers appointed for such purpose.
- (c) The simultaneous dipping of all sheep and goats during the months of April and May in each year under supervision.
- (d) The introduction of sheep and goats into or through any block which is being, or has been treated, to be entirely prohibited.
- (e) Every farmer to have his own tank and dipping appliances.
- (f) The use of sulphur and lime, or sulphur and soda only to be permitted.
- (g) The imposition of heavy penalties, for failure to report outbreaks of scab, the removal of infected sheep, or the introduction of small stock from outside the block cleansed or in process of treatment.

If measures of the abovementioned nature are adopted and carried out in a firm, fearless and impartial manner, the staff concentrated in the first block, could within a period of eighteen months be materially reduced and the majority of the men transferred to Block No. 2.

As regards the appointment of officers to administer the Act I must take the liberty of again quoting from my article published in 1899, in which the following remarks occur:—

"The principles adopted in any general scheme of scab legislation should be somewhat on the following lines:—

"(c) Provision to be made for the promotion of deserving Inspectors—my opinion is that there should be three grades, first, second and third, with corresponding increases of salary for each step gained. The

rise in emoluments should be solely on merit, gauged by the quality of the work performed. This would offer a healthy inducement for men to attain the higher ranks and on the other hand the system would afford the Government the means of showing disapproval of any carelessness or neglect. An alternative punishment would thus be provided when the offence committed by any member of the staff was too serious to be met by a reprimand and yet not of sufficient gravity to warrant the summary punishment of dismissal, the inspector at fault could be reduced to a lower grade."

With respect to the class of men who should be appointed as Sheep Inspectors this can perhaps be illustrated in no better manner than by referring to the evidence given before the Scab Commission at Carnarvon in April, 1893, when Mr. A. J. Vorster, in answer to certain questions, said:

"As far as that goes I would like myself to be under such personal inspection of somebody who knows more than I do. I think it might be a farmer of the kind, but a man altogether independent who does not belong to this district."

Mr. Vorster, in the above replies, struck the correct note: for we require inspectors to be men who are in advance of the general class of farmer, who can advise them as to the proper measures to adopt, and who have had sufficient experience to guide and direct those whose stock come under their control. Such men should only be appointed when they have satisfactorily passed a severe practical examination, and thus proved themselves thoroughly qualified in every way for the position of sheep inspector. Above all things the Inspector should be a stranger in the district for which he is appointed, and the Government should have the power at any time to transfer him to another area, when such a course is considered desirable. As an example of the difficulty at present experienced in this respect I need only quote one case in a certain district in which there are three inspectors, who shall be named A, B, C. A. is the son of B, and son-in-law to C., whilst B. and C. are cousins. Can it be expected that when inspectors in the same district are related in this manner, and at the same time connected with many farmers in the area which they supervise, that matters will be worked in an impartial or satisfactory way, or the provisions of the Scab Acts properly carried out. Experience has shown that even with our present legislation, scab can be eradicated, provided the inspectors are qualified men and secure the co-operation and support of the stock owners in their areas. On the other hand, when the officers appointed are incompetent and the majority of farmers opposed to Scab legislation little or no advance can be made towards the desired end.

We now pass on to the cleansing of scabby flocks and the treatment of infected kraals, etc. In this respect it is imperative that in every case the work should be carried out under supervision for which purpose well qualified men should be appointed to deal with each case as it may occur under the direction of the local sheep inspector or assistant of the area. Infected kraals, premises and sleeping places, must be destroyed by fire, or when that is impracticable, enclosed in a suitable manner. This is also a consideration of the greatest importance, for recent experiments have proved that in such places the infection can remain in a dormant state for at least three years and possibly for a longer period. It may be deemed an exaggeration (especially in view of the fact that scab legislation has been in force throughout the Colony for the past fifteen years) when I repeat the statement that fully seventy-five per cent. of the farmers do not dip their sheep in a methodical and effectual manner. I am convinced, however, that my contention in this respect is well within the mark, and if I have erred in any way, it is in an underestimate of the

percentage given. The majority of farmers either mix their dipping ingredients below strength, or the stock are hurried in at one end of the tank and out at the other, before the dipping mixture has penetrated to the skin. As an example of the spirit of false economy which is practised by some farmers, I may quote the following instance which recently occurred in one of the north western districts. One of my assistants happened to arrive on a farm just after the sheep (which were infected) had been dipped and learnt that between sunrise and 11 a.m. the same day, some 1,800 sheep had been put through a mixture consisting of 600 gallons of water, to which four gallons of a carbolic fluid had been added. When it is explained that to dip this number of sheep in a proper manner in the appliances available on the said farm would occupy at least two days, and the printed directions attached to the dipping mixture used, require that one gallon should be used to fifty gallons of water, it will be at once apparent that treatment of the nature mentioned must be productive of more harm than benefit to the stock concerned. This is by no means an exceptional case but is an instance of how dipping is carried out in many parts of the country. I maintain therefore, that it is imperative that all cleansing operations should be conducted under proper supervision.

Thirdly, as regards a simultaneous dipping in the autumn. It has already been shown that scab invariably increases during the winter months, and generally at a time when the stock are in their lowest condition, and either just before, or during the lambing season. If proper precautions are taken in the summer months when the weather, as well as the condition of the stock are favourable, there would be little or no reason for dipping during the trying time of winter. The thorough treatment of stock and premises is, however, too often neglected when the conditions are propitious and this neglect frequently accounts for the remonstrances which are heard against treating the sheep in winter time. During the simultaneous dipping, all flocks (with the exception of those which have remained clean for twelve months or longer) should be dipped twice within from ten to sixteen days, and at the same time kraals and premises which may be deemed a source of danger should be destroyed or enclosed. The dipping, as well as treatment of kraals must be carried out under supervision and flocks which have remained free from scab for twelve months or longer dipped but once. If the autumn dipping is done in a painstaking and thorough manner, there would be little fear of the disease appearing during the winter months.

In connection with the removal of sheep while the block system is being conducted, there is but one road to success and that is by rendering each Block a water-tight compartment and prohibiting the introduction of any sheep or goats from outside the area under treatment. Here we are face to face with a dividing line and the difficulty of keeping that boundary intact will be at once apparent. It is a difficulty, however, which must be faced and can only be overcome by the greatest vigilance on the part of the border inspectors, the entire co-operation of the stock owners on the boundary and the imposition of extremely heavy penalties for any contravention of the law. The removal of sheep within the Block is a matter which can be dealt with at a later date, but I see no reason why clean stock should not be allowed to leave the area which is under treatment.

We now pass on to the matter of dipping tanks, and here again there can be no question as to the course to be adopted, for every farmer must construct or provide a tank on his property. The time for suppressing the disease has passed and if the solution of the question is to be approached in the true spirit, the law should provide that no infected

stock may be removed from the ground on which they are grazing until a thorough cure has been effected.

As to the ingredients to be used for cleansing purposes, I have but one suggestion to make, and that is that only sulphur and lime or sulphur and soda be authorized. These ingredients have no equal as far as their curative properties are concerned, and in addition to this they act as preventives to re-infection for a much longer period than any other preparation known in this country. When scab has once been eradicated, by all means allow farmers to use whatever ingredients they may select for the destruction of ticks and keds, but until the desired goal has been attained, the use of the dips I have mentioned should be made compulsory.

Lastly—the law must provide for heavier penalties for the punishment of those who fail to comply with its requirements. Take the case of an owner who fails to report an outbreak of scab among his sheep, and thus endangers the safety of thousands of clean stock which may be grazed on surrounding land. A penalty of even £20 would be inadequate, for when the source of infection had been discovered, the work which may have cost hundreds of pounds to accomplish may have been undone. Or again take the instance of the man who may introduce infected sheep into the Block already cleansed or under treatment, could it reasonably be expected that a paltry fine would satisfy justice or act as an intimidation to others to avoid the same action. Many speculators at the present time reap a rich harvest by removing infected sheep, knowing full well that if they are perchance caught in the act of transgressing the law, the punishment inflicted will only diminish their profits by a very small amount. If substantial fines are provided for in the new law, there will at least be no inducement offered to men to contravene its provisions.

I have endeavoured to give, in the foregoing, the bare outline of a law, which I believe, if it were strictly and impartially administered, would in a reasonable time (say six years) serve to stamp out Scab in the country. Much, however, remains to be filled in before the sketch can be completed, but if such details are added in the honest endeavour to construct a Bill for the eradication, and not merely the suppression, of the disease, I for one have not the least doubt as to the ultimate success of the measure.

It remains now to consider briefly the nature of the law which should be enforced in that part of the country outside the block or blocks under treatment. In order to secure co-operation on the part of the stock-owners, I consider that it would be advisable to allow the present Scab Acts to remain in force, with the addition of a few amendments which would refer solely to the removal of infected sheep.

In the Scab Act of 1894 there are three sections which permit of infected sheep being removed. These are: Section 37, which allows of the removal of infected sheep for the purpose of slaughter after one dipping has been administered; Section 38, which sanctions the removal of scabby sheep during periods of drought, when the stock have either been hand-dressed or dipped; and Section 41, which allows scabby stock which belongs to servants or bywoners to be removed after one dipping. These clauses, which I maintain are responsible for most of the scab in the country, should be repealed. For all purposes, however, the removal of infected sheep may be classified under two heads, as follows:—

- (a) for purposes of speculation or slaughter, and
- (b) for change of pasture.

In the case of sheep which are intended for barter or slaughter there exists no reason whatever why such stock should be removed in an infected state, for if sheep are in fit condition to be sold, they can certainly be cleansed prior to removal without any detrimental effects. In this instance, at least, no plea can be raised that the low condition of the stock would militate against dipping being carried out. Moreover, it would

certainly be to the advantage of both seller and purchaser if the stock in question were clean and healthy. The Scab Commission, which travelled through the Colony in 1892-93, although recommending that infected slaughter stock might be removed after one dipping, clearly indicated in their report that such stock should be again dipped at an interval of fourteen days if they had not reached their destination or all been slaughtered within that period. This, however, was not embodied in the legislation of 1894, and hence we have the continual danger of scabby stock with the disease only partly cured, being driven all over the country. Removals of the abovementioned nature should be entirely prohibited, and if this was done a further inducement would be offered to careless farmers to keep their sheep in a clean state. The removal of sheep for change of pasture is confined to a very great extent to what is termed the North-West Area, which is defined in the Scab Act of 1899 as comprising the following districts:—Calvinia, Carnarvon, Ceres, Fraserburg, Kenhardt, Namaqualand, Prieska, Sutherland, and Van Rhynsdorp. It is true that in some of the Midland Districts many removals of infected stock have been effected during recent droughts by means of Section 38, which permits of scabby sheep being moved under certain conditions. It is in the North-West Area, however, that most of the removals under this clause take place. If we glance at the evidence taken by the Scab Commission in 1893, it will be found that in the North-West the majority of the witnesses examined were opposed to scab legislation of any kind, and the Commissioners when dealing with this portion of the country report as follows:—

“The principal arguments advanced by certain farmers residing in the North-Western and Western Districts against the possibility of such districts being placed under scab legislation were the prevalence of drought and the scarcity of water, which would prevent their complying with the restrictions on the removal of scabby stock, though they appear to overlook the danger to clean flocks by such movements.”

Exactly the same arguments prevail at the present time, and as in 1893 the majority of witnesses examined before the Commission maintained that scab was not contagious, that when the seasons were favourable the disease disappeared without any action being taken by the owner of the stock, so to-day it is contended that the dipping of sheep is injurious to the animals treated in dry seasons and unnecessary when the pasture is good. In the evidence above referred to many witnesses expressed the opinion that the transit of infected sheep over clean farms should be prohibited, and one farmer remarked before the Commission that:—

“I am doing my best to keep down scab. It does not help me much, because according to the practice in this country there is continual trekking of scabby flocks over my property, which lie about and rest there for a certain time. I have neighbours who don't take the same view as I do, and are not particular in dipping, consequently my sheep become infected, and I am put to expense, and require some protection in the shape of a law.”

Even with the Scab Acts of 1894 and 1899 in operation, the same position as that above quoted obtains at the present time, and the farmer who wishes to keep his stock clean cannot do so, by reason of the large number of infected sheep moved about the country.

The crux of the whole question lies in the fact that when the seasons are favourable and stock in good condition, the great majority of farmers in the North-West do not take proper measures to cleanse their stock, as they believe that Nature will work the needful cure without the intervention of the owner. If the farmer undertook the cleansing of his flock

when the disease first appeared there would be no reason why he should be hampered or delayed in any way when the time comes to remove the sheep. Procrastination and temporising has, however, played such an important part with many stock-owners that everything in the form of cleansing is put off from day to day, and when the climax does come, it as often as not finds the sheep in an infected state. A little foresight exercised by the stock-owner would have prevented untold loss and misery, and at the same time saved the lives of thousands of sheep.

It is in the North-West we have always experienced the greatest difficulty, and it is from this part of the country that scab has spread broadcast over a large portion of the Colony. The questions may, therefore, be asked: Is it reasonable that such a state of affairs should be allowed to exist any longer, and is it imperative that the removal of infected sheep should be permitted even in this part of the country? My answer to these queries is as follows:—In the first place, it is an injustice to careful farmers to allow scabby stock to trek over their farms. It is also a false policy to permit the farmer to remove his flocks until they have been cleansed, for the careless owner will never take the necessary measures to clean his sheep, whilst he has the alternative of moving infected stock. Secondly, I maintain that there is no reason why any scabby flocks should be permitted to move about the country, and in connection with this I must again refer to my article published in 1899, in which the following occurs:—

“If during a period of drought sheep should become infected with scab, the opinion of many farmers seems to be that to attempt cleansing operations would be detrimental to the condition of the stock, and might render them less able to withstand the severity of the season. Arguments of this nature are as cruel as they are fallacious. Scab and poverty combined tell more upon the condition of the animal than poverty alone. Too often the dumb animal is left to contend with its worst enemies—disease and drought—without any effort being made to alleviate the sufferings which any farmer has it in his power to accomplish. The whole question simply resolves itself into this, that under our present system of scab legislation the inducements offered to the farmer for the suppression of scab are greater and infinitely more attractive than those embodied in the law for the eradication of the disease.”

When it is contended that sheep should only be removed in a clean state, the questions naturally arise: whether stock can be cleansed in the North-West, and if it is always practicable to dip sheep in a proper manner? To both of these queries I have no hesitation in replying in the affirmative. My contention is that scab can be eradicated much more easily in the dry climate of the North-West than in the damp, humid coast districts. The very disabilities mentioned by some witnesses from the North-West who appeared before the Scab Commission, viz., the vast extent of the properties owned by farmers, is in itself one of the advantages denied to stock-owners in the Eastern Province: for it enables the farmer to graze his stock on clean pasture when a cure has been effected. The plea that the water is too salt to assimilate with the dipping mixtures generally used by farmers has also proved to be without foundation. Even the worst waters found in the North-West can be used with the most effective results when sulphur and lime or sulphur and soda are selected to dip with. Scarcity of water has also been raised as an excuse why dipping cannot at times be carried out, but even this is disproved when careful inquiries are made. Take, for instance, that portion of the North-West known as the Kaien Bulte. Thirty years ago the traveller had at times to proceed sixty miles at a stretch before water could be procured

for his horses or cattle. The energy of man, combined with a slight expenditure, has altered these conditions completely. The same results can be obtained on any farm, and in nearly every instance but little labour or capital is required to procure the necessary supply of water. On this point the evidence given by one of the farmers of Fraserburg before the Scab Commission is worthy of repetition. The question (No. 13,561) being asked: "Are you aware that on the majority of farms in this district there is no water to be found, even when they have sunk or dug wells?"—the following answer was given: "No, such is not the case. If you dig for 25 or 30 feet anywhere in the district you get water. In the district of Williston sometimes it is bitter, but then it is just as good for dipping."

Those who in 1893 objected to scab legislation brought forward many arguments against the introduction of such a law, and these, which were repeated before the Commission with an unvarying persistency, may be summarised as follows:—

Answer 13,025.—I never dip; my sheep get clean when the rain comes.

Answer 13,137.—They (the sheep) cure themselves; just give them better veld, and it grows out in no time.

Answer 13,299.—It is no good to dip sheep when they are falling off in condition, as instead of cleansing them, you might kill them.

Question 13,490.—Do you believe that scab is spontaneous?—

Answer: Yes.

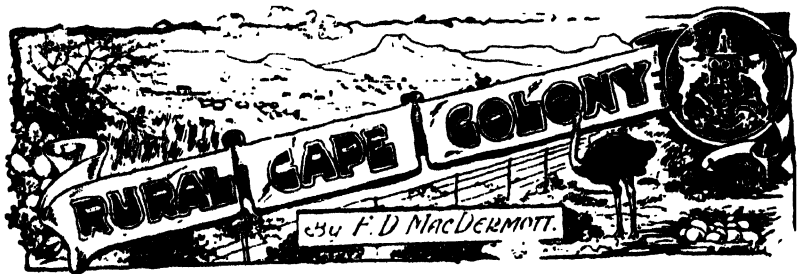
Answer 13,527.—Dipping does them (Cape sheep) more harm than scab.

The opinions expressed in 1893 are still held at the present time by the majority of farmers in the North-West. Converts there may have been, but these are few in number, and in many instances are afraid to express their opinions in an open manner. Those who still persist in holding the opinion that scab is spontaneous, and that dipping is of no avail either when the seasons are good or bad, have been more than ever convinced that their arguments are correct, owing to the failure of the legislation introduced to effect any improvement of a permanent nature.

The facilities which exist for the removal of infected sheep in our present laws do not tend in any way to induce the careless farmer to clean his stock. As a rule, the majority of owners in the North-West farm with Cape or cross-bred sheep, and thus the production of wool with such men is not a matter of any consideration or importance. The main object is to dispose of the surplus stock, and if this can be arranged by once dipping the sheep to be sold, the question is asked, why should additional expense as well as labour be involved in dipping all the sheep on the farm?

If the facilities allowed in the Scab Acts for the removal of scabby sheep were withdrawn, an additional impetus would be offered for the cleansing of infected sheep, and we may hope that some substantial progress would be made in that direction.

If the Acts of 1894 and 1899 are altered as I have suggested and kept in operation in each block until the time arrives to attack that area by means of the legislation which has already been proposed, I see no reason why the disease should not be eradicated within a period of six years. If such a scheme is accepted in the Cape Colony, it might with equal force be applied to the whole of South Africa. All that is necessary is one determined and combined effort, and the greatest obstacle to successful sheep farming in South Africa would be overcome.



No. XXX (Continued from page 195).

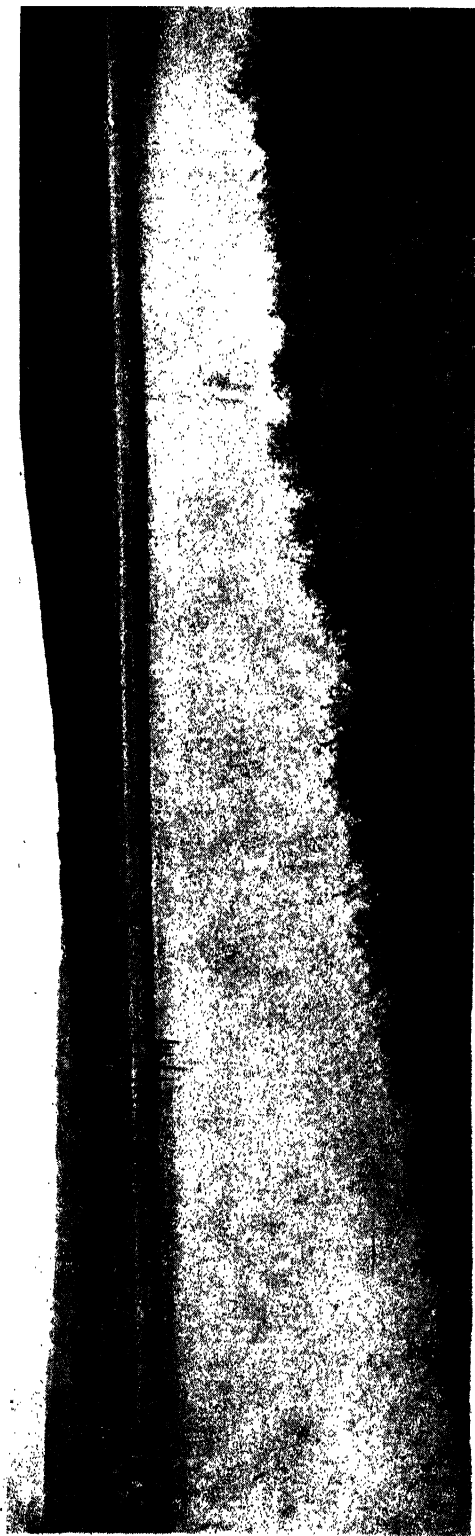
AGRICULTURAL ENTERPRISE IN THE ARID SECTIONS.

THE SMARTT SYNDICATE FARMS IN THE BRITSTOWN DISTRICT.

On entering the Britstown District from De Aar by rail there is nothing very striking about the country to differentiate it in any way from the Karoo that surrounds it. The same features predominate. The rolling plains interspersed by the ever-recurring koppies, vegetation of the usual Karoo description and the dry, stimulating atmosphere which is so marked at these altitudes. The district of Britstown lies on an average about 4,000 feet above sea level, and with its limited rainfall of about eleven-and-a-half inches per annum may be safely classed as among the arid regions. There are other districts which are not so blessed, their average precipitation being considerably less, so that, comparatively speaking, Britstown, though dry, is not so dry as others. But for all farming purposes its conditions must fall under the description "arid."

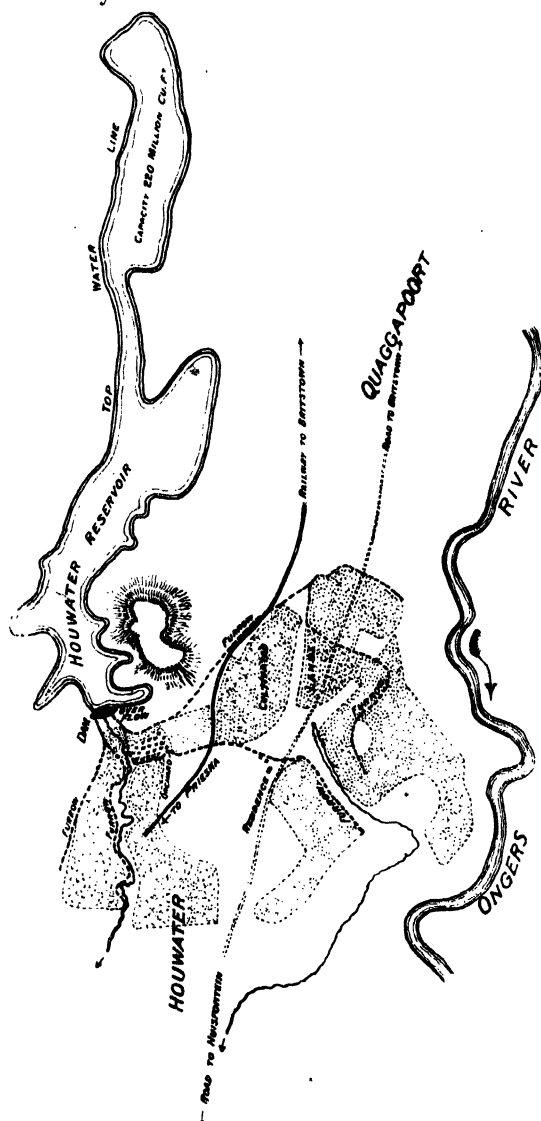
A GIGANTIC DEVELOPMENT SCHEME.

It is impossible to enter the district without being at once made aware of the magnificent development scheme now in full swing on the enormous stretch of country known as the Smartt Syndicate Farms. As is generally known, this scheme was initiated by the Hon. Dr. T. W. Smartt, M.L.A., ex-Commissioner of Railways and Public Works. It is a good many years back now that Dr. Smartt was practising his profession in the Britstown District, and while there he, like so many others, fell violently in love with what has been so often described as the "Barren Karoo." He, however, unlike a good many whose emotions have thus been affected, made up his mind to translate his sentiments into a practical shape by settling down to the life of a Karoo farmer. He began by purchasing the farm "Ercildoune," which now forms part of the Smartt Syndicate Estate, and there began his agricultural experiences by taking up sheep-farming. Dr. Smartt's name soon came to be known in the sheep world, for he at once began to introduce some excellent types of woolled sheep into the district, and was so successful that he was early recognised as one of the most enterprising farmers in the Colony. His sheep attracted attention at the most important of our Agricultural Shows, and not only that but his striking personality so impressed many of the leading sheepmen that his views and



1. Houwater Dam, showing section of water and dam wall with boathouse and scour valve staging. 2. The Homestead at Doorskuilen.

opinions on the details of this interesting branch of stock-farming gave him a very high place in their ranks. Dr. Smartt was, and still is, an enthusiast where woolled sheep are concerned, and even during the period he has devoted to political work, with all its exactions and demands upon his time and attention, he has never neglected this side of the farming industry of this country.



Sketch Plan of Houwater, showing extent of the Dam.

The development of the present scheme, however, covers a much wider field. Seeing the possibilities of this part of the Karoo, Dr. Smartt gradually acquired other properties and thus extended his influence until the proposition became so big and the amount of capital involved so great that the Syndicate was formed in his name which now controls the wide expanse of country for which the works I shall now attempt to describe are being planned.

THE GREAT HOUWATER DAM.

About twenty miles beyond Britstown, along the railway line to Prieska, lies the farm Houwater, one of the first which has been developed on a large scale. The evidences of this development are to be seen long before one alights at the station, or siding rather, for in the distance can be seen the welcome stretches of green which speak so eloquently of water in a thirsty land. As one gets nearer it can be seen that all this is cultivated land, while on either side stretch even more and yet more lands being carefully laid out and prepared for crops.

Arrived at the alighting spot I naturally asked to see the great dam of which I had heard so much, and before proceeding to the homestead I was taken across the farm to the embankment that impounds the enormous supplies of water which have been made to change the appearance of the country hereabout. After some ten minutes fairly heavy going through ploughed lands, orchards and lucerne, we reached the top of the dam wall. I was prepared for a good deal, but was more than surprised on realising the extent of this magnificent piece of work. From the highest point available it is not possible to see the whole of the surface of the water. This will be seen from the sketch plan of the outline which accompanies this, kindly supplied by Mr. W. Ingham, the engineer-in-charge. The dam itself is no less than six miles in length when full, and varies in width considerably owing to the contour of the containing hills. The dam wall, of which some idea may be obtained from the photograph herewith, is 180 yards in length. It is an earthen construction, faced with stone, with a wide spillway to carry off the overflow. The average depth of water over the whole sheet when the dam is full is about nine feet. The depth at the wall above the outlet pipe is 22 feet. The whole contains, when full, about 6,000 acre feet of water.

Such a piece of work is beyond the capacity of the ordinary camera, unless one could get up in a balloon or an airship. The view of the dam wall, in fact, gives scarcely any idea of its dimensions. That only shows what the wall looks like from a spot across one small corner of the dam. The small structures seen against the wall are in reality rather large, the one being a boathouse to contain the pleasure boats used by the staff and the other being the staging from which the large outlet valve is worked. However, the sketch plan explains most of these details.

The lands watered from the dam all lie on the lower side. The natural flow of the flood waters which are caught up here runs through a rather wide valley which opens out below the dam, and the cultivation is carried quite close up. By keeping the irrigation furrows fairly high, this water is also carried across the railway to the other side of the farm, where another large area of land is brought under its influence. The valley below the dam in the old days was utilised for cereal crops, the water being applied on the "zaai-dam" principle when the floods were out, and after a thorough soak in the crops were sown. This land is now all under regular irrigation from the dam. The majority of it is laid down to lucerne and orchards, and very well everything looks.

On the other side of the farm a good deal is also laid down to lucerne, but there is still a large quantity of grain grown. On the land most recently brought under a very fine crop of wheat was being harvested when I was on the farm, the estimated yield being from 1,500 to 2,000 bags. Later on, I understand, the intention is to sow all this with lucerne.

At the present time the dam waters some 700 acres, of which about 400 acres are in lucerne, the rest being under cereals, fruit trees and vines. The vines and orchards are very promising and should soon be giving good returns. Among the fruits cultivated are apricots, peaches, apples

and pears. Of these the apples and pears do the best, the stone fruits being uncertain, owing to the climatic conditions. Tree planting on a fairly large scale has been taken in hand, and tamarisks, poplars, Aleppo pines, cypresses, beefwoods and other varieties have been established with fair success. These are mostly planted as shelter belts for the orchards.



1. Harvesting Wheat at Houwater. 2. The Orchards at Houwater. 3. Cattle grazing in Tjgerpoort Vlei.

A new departure has been made recently by the introduction of high-class ostriches. For some time past ostriches have been kept on the farm, mostly wild birds, of which there are about four hundred all told. But recently some of the better class birds from the most notable strains

in the Midlands have been introduced. These include birds from breeders like Mr. Oscar Evans, the Whites, and Mr. Gilfillan. So far the introduced birds have done very well and there is no reason to suppose that they can be anything but a success. If all the development promised



Reaping and Loading Lucerne - Hay at Honwater.

is carried out and the whole thousand acres or so of arable land laid down to lucerne, there should be ample room for ostrich farming on a very big scale.

The soils seem to vary a good deal on this farm. That in the valley below the dam is a fairly friable open loam, but on the other side of the farm the texture of the soil is finer and is consequently more of a stiff,

clayey character. This is giving a little trouble on the cultural side for the moment but should improve with further working. As in all these arid soils there seems to be a proportion of brak, but so far it has given rise to no real trouble; if appearances are any criterion there should be no serious brak problem to solve provided ordinary care and caution are exercised.

The number of fruit trees actually established here is 2,500, and the number of vines 6,000. In addition to the irrigable area on this farm the water of the dam commands another 480 acres on an adjoining farm known as "Rietgat."

To give some idea of the extent of these properties I may here mention that on leaving Houwater I had to travel something like fifteen miles by cart and on horseback, mostly through the Syndicate's farms before I reached the next main objective, namely,

THE GREAT DAM BUILDING AT KAFIRS POORT.

The illustration which I am able to publish with this, for which I am largely indebted again to Mr. W. Ingham, the engineer in charge of this work, and Mr. Mugglestone, the manager of the Syndicate farms, shows more of the actual nature and extent of this work than I could possibly explain in words.

To make the situation clear I must again go back a little. On my way from Houwater I was taken out of the usual course and after crossing a little rough country on horseback we descended into a most remarkable spot. The Ongers River, in which the big dam is being built, drains a very long stretch of country. It rises away back in the Victoria West and Richmond districts and has a catchment area of several thousand square miles. This river, when in flood, as will be seen from the photographs, brings down enormous volumes of water, and instead of this water spreading out as in some parts of the Karoo, it is all narrowed into a comparatively limited channel at Kafirs Poort. For some miles below the poort it runs through a fairly wide valley, but further on it passes the remarkable place mentioned above. This is known as

TIJGER POORT VLEI.

In times of high floods the river flows all over this vlei, the ground being fairly even and the soil deep, apparently silt from the accumulated ages. And it has always been looked upon as a splendid piece of veld. The formation is rather remarkable. Unlike the usual vlei, this is almost surrounded by a range of hills, being open only on the side through which the river runs. The result is that its soils have the advantage of retaining moisture for a considerable time. So that after one good wetting the grass grows luxuriantly and remains succulent for long periods together. Under the big scheme inaugurated with the inception of the Kafirs Poort Dam I understand this will all be brought under irrigation, and, presumably cultivation. As this spot alone will supply some thousands of acres the ultimate extent of the scheme may be imagined. It is undoubtedly one of the largest and most important ever attempted in the Karoo, and deserves to be crowned with success. What the ultimate intention may be, that is whether the lands when ready are to be given out in allotments or whether the whole proposition is to be worked on commercial lines under one management I was not able to ascertain. In fact I do not think any decision has been arrived at in that respect. All that one can see on the spot is that it is a vast undertaking and one that in any case must prove of great benefit to the country no matter how it may be managed. But that it could be handled under one management seems a little doubtful.

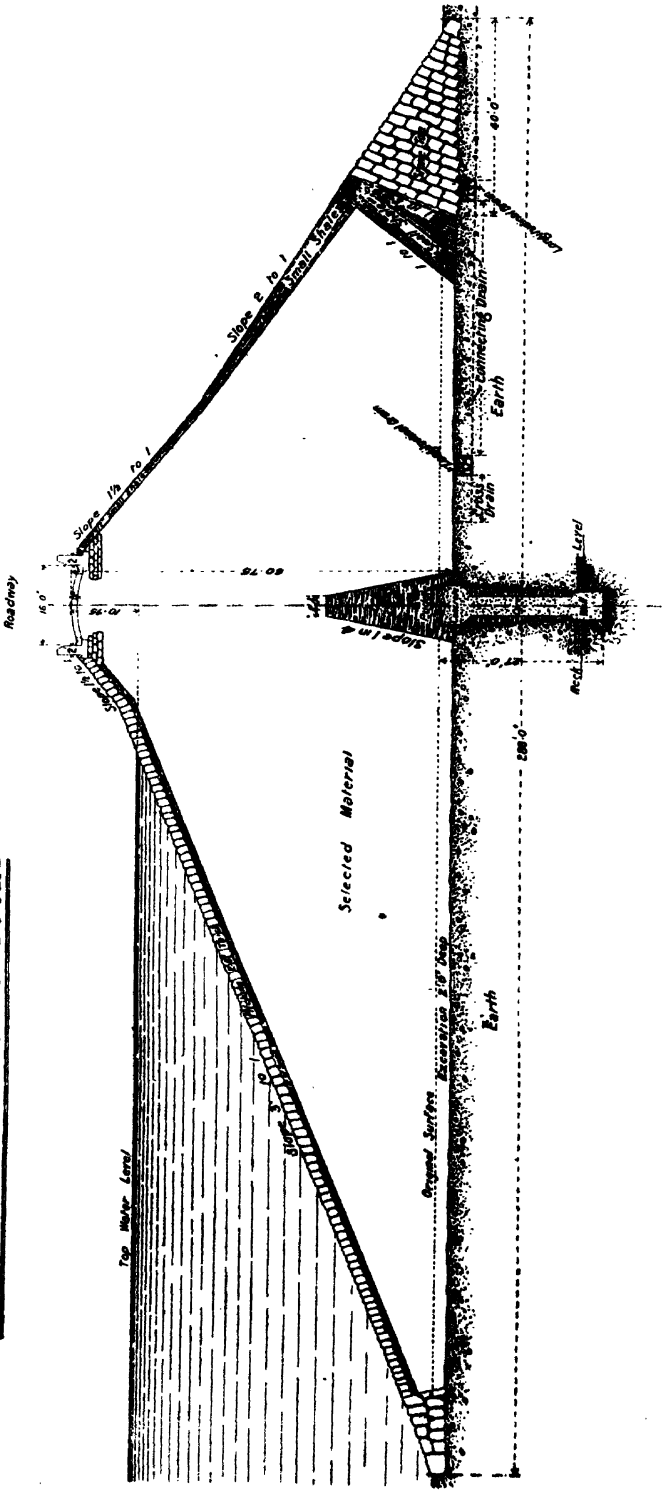


Franco-American Stud Rams at Doorskuilen.



Stud Ewes and Lambs at Doorskuijen.

— MAIN DAM — KAFFER'S POORT —



SOME DETAILS OF THE WORK.

The following details of the work, when read with the plans and illustrations herewith, should prove both enlightening and interesting.

The scheme comprises two dams, one an earthen dam and the other of the Rock-fill type. The earthen dam is the largest and has a length of 1,640 feet and a maximum base width of 288 feet.

The trench which runs the whole length of the dam has a maximum depth of 47 feet below the surface of the ground on the East bank and 27 feet below the Ongers River bed. The whole of the trench below the river level required timbering, some of the material proving very treacherous.

The timber required for the trench covers an area of over 20,000 sq. feet and the struts number about 600.

The trench at all points was excavated down to solid dolerite as the material above it was too open and would have allowed leakage. The trench is filled up with a concrete core wall for a height of from 20 to 27 feet and on the top of the concrete a puddle wall is being made to a height of 28 feet, the top being 30 feet below crest level of overflow. The upstream face of the dam will be constructed of the best selected material and the remainder of various kinds of earth and stone.

The earth will be placed *in situ* with wheel dam scrapers (size No. 3) holding about half a cubic yard and the earth will be well rolled or tramped by oxen. Over 300,000 cu. yards of earth will be required for the dam, 3,000 cu. yards of concrete, 12,000 cu. yards of puddle and over 30,000 cu. yards of rock.

The front or upstream face of the dam will be pitched with a 2 feet layer of stone and the downstream face will be covered with shale.

A road, 16 feet wide between parapets, will be constructed over the dam as a substitute for the present Vosburg Road, the road diversion having a total length of 10 miles.

About 170 mules and 280 oxen are employed on the works, while from 300 to 400 men are on the books.

The water will be withdrawn from the reservoir by three 3 feet pipes, it being suggested that two should be used for irrigation and the other for power. In case the power scheme is finally adopted it will be developed by a turbine and transmitted electrically wherever required.

The reservoir will have an area of 6,457 acres or a little over 10 sq. miles. The length will be 8 miles and the greatest width 3 miles, while the maximum depth is 48 feet to overflow level, the latter level being 10 feet below the crest of the dam itself. The capacity is 4,000 million cu. feet or 25,000 million gallons, or 91,800 acre feet.

The rock fill dam will be constructed of rock with a central core wall of concrete, the maximum height in this case being 22 feet and the depth of water, when level with overflow, 15 feet. The dam will have a length of 714 feet, a top width of 16 feet and a bottom width of 80 feet. The rock fill dam will not be commenced until the main dam is nearly finished owing to the fact that it can act as a waste weir while the upper portion of the main dam is being constructed.

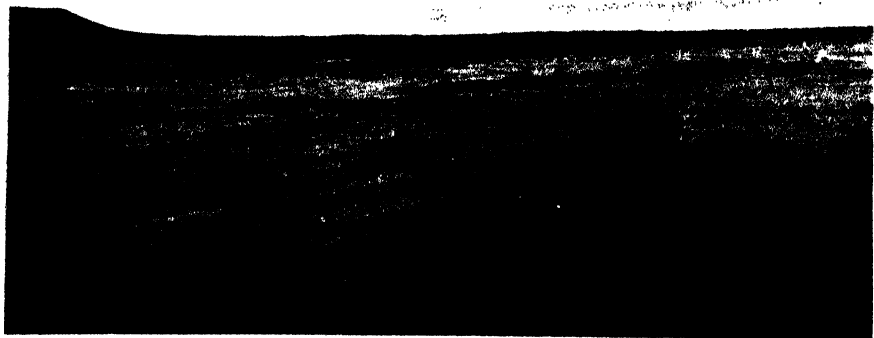
The overflow weir will be situated some 6,000 feet away from the main dam.

The main furrow for the first portion of the land to be placed under irrigation will be 15 miles in length and the width varies from 35 feet at the dam to about 10 feet at the Tiger poort end of the furrow. The 35 feet furrow is capable of discharging 300 cu-secs or 162 million gallons per day.

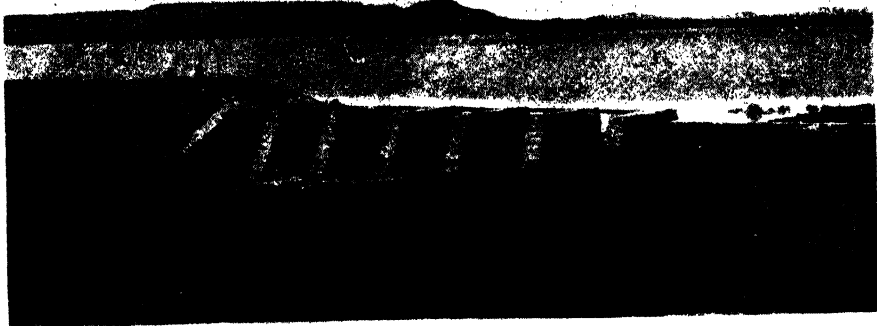
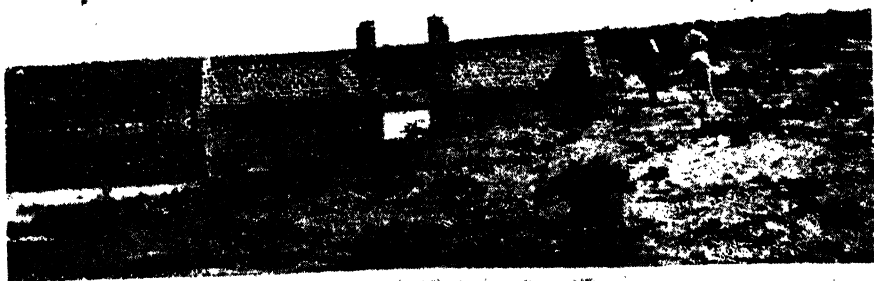
The initial area to be placed under irrigation is about 9,000 acres in extent but the ultimate area is nearly 25,000 acres.



Views showing progress of getting foundations in for the big dam at Kafir's Poort.



Views showing the Ongers River in flood and the enormous volumes of water that run away.



Views of Gembok Dam showing methods of watering and heading the surplus for irrigation purposes.

the founder of this great enterprise is noted pervades everything that is done or planned. There are no idlers on these farms. Everywhere activity is the keynote, and order and discipline the method of working. The photographs of the sheep show that the Ercildoune Flock is not likely to lose its reputation just yet. On these farms, in addition to the sheep and ostriches mentioned there are, of course, large troops of cattle, horses and mules. The farms, in fact, not only supply the draught animals for the farm work, but keep up a full supply of animals for the heavy works at the big dam. This shows what can be done here, for this means hundreds of able-bodied, sound, animals in good working condition.

GEMSBOKDAM --ANOTHER STRIKING FEATURE.

On returning to the railway at Britstown I was given the opportunity of visiting another remarkable spot which shows what can be done in these dry sections. Gembok, the farm in question, is within a few miles of the town, and is known as Gembokdam because of its leading feature. This consists of an enormous depression through which the flood waters flow when the waters are out. Being very level, advantage has been taken of the natural features to turn it into a huge "zaai-dam." At the lower end where the containing banks were breached and the water used to flow out all these apertures have been closed, and in some of them a series of sluices or regulators have been fixed. These enable the farmer to keep a perfect control of his waters. When he needs them and they are available he holds them on the land, when his purposes are served he opens the regulators and lets the water go. But these waste waters are not allowed to flow off unchecked even then. They are turned into lower lands and again on to the veld where they serve the further purpose of refreshing the natural pasturage and thus add again to the productive power of the farm. By this means some two thousand bags of wheat have been raised this year in addition to the beneficial action of the flood waters flowing gently over the veld. Altogether a most interesting proposition.

In point of fact one cannot visit these farms without being seriously impressed with all that is being done. It is almost unbelievable, unless one has been over the properties. But here they are in the midst of arid conditions, with little recommendation but a marvellously healthy climate, favourable for man and beast; with water scarce; but with one great advantage the natural drought resisting vegetation. This country is being made to blossom like the rose, by the systematic efforts of a group of capitalists guided by the genius of one enthusiast. And this is only the beginning. Let anyone who knows what this section is like now try and imagine what its appearance will be, and its potential wealth production, when these mighty schemes have attained fruition. Imagine the twenty-five or thirty thousand acres to be brought under irrigation and the industry they will maintain. And above all think what an example to others such efforts must be. We all know of the courage and resource which have ever been the necessary outfit for farming in the Karoo, and what has been done there; but there are few schemes in this country to compare for magnitude and confidence with that of the Smartt Syndicate. We may add that all these works have been undertaken at the instigation and under the supervision of the Director of Irrigation.

VELD DETERIORATION.

Mr. C. G. Lee writes:--The consequences of veld deterioration have gradually become so serious till now they mean a far-reaching national loss. This is no secret, but a recognised fact, the saddest feature being that the direct sufferers, the farmers, for several reasons, are imperfectly armed for the fight against the evil, and they, as well as the country generally, will hail with encouragement the Government's recent action in appointing a Plant Investigator--fortunately that plant enthusiast, Mr. N. S. Pillans, being selected for the post.

The appointment supplies a long-standing need, because it will tend to equip the country in at least one important particular in dealing with veld deterioration.

These investigations should help to reveal more clearly and forcibly the actual food value, medicinal properties, and natural functions of our best native trees, plants and grasses, as well as marking more distinctly such as are useless or poisonous.

This information will remove much existing uncertainty from the minds of the average farmers, thereby stimulating an amount of activity hitherto unknown in the work of maintaining what remains and restoring much of the partially-lost veld growth. The urgency and importance of such investigations become more apparent when calling to mind the fact that the natural veld provides the chief food supply for the country's great stock industry. Since that is the case, I hope a few thoughts upon the subject will not be out of place, given, however, without pretence at detailing the benefits that must result from special scientific research made with the set object of veld improvement. Also given without wishing in the least to under-estimate work of this nature done in the past.

Allow me to say that many years of costly experience has given the average farmer a kind of knowledge respecting the very great variety of plants. But this knowledge appears to be of very little value considering the suicidal and indiscriminate destruction going on through continuous overstocking, nightly kraaling of stock, burning of veld, and in other ways clearing off the much-needed veld growth.

Almost needless to say, the pioneer farmers who started this destructive work were in a great measure forced into the position by surrounding circumstances, but the days of that kind of pioneering are ended long since in the districts where the worst forms of destruction are now practised. As might perhaps be expected, the habits handed on have an influence on the present; at the same time I venture to think to-day's destructive work would not be tolerated by our forbears if they lived in the midst of present-day privileges. Yet there is this buoyant hope, the people of to-day are largely the descendants of those determined pioneers, and must, therefore, possess grit enough to make greater efforts to save themselves, which more light and knowledge will stimulate if supplied in a right spirit and in an understandable way.

Furthermore, it is perfectly clear that the want of capital at low rates of interest has driven, and is still driving, many to act contrary to their better judgment. As a result the veld is sacrificed knowingly while determined attempts are being made to gain a financial foothold, but, sad to say, the odds prove to be against the struggling farmer in this matter, and it is high time that State aid came to the assistance of those who may be worthy and with whom security for a loan still remains. If possible, is it not better for the State to help a man before he gets financially at the very bottom, rather than lift him later on through State-aided Poor White Industrial Colonies, as was decided during the last Session of Parliament. Of course, such a measure is good for those already down. I do not mean to infer that every man whose veld is being sacrificed will eventually go to the Poor White class because that is not so, but a large percentage will. It must be admitted that it is wiser to turn every sufferer into a State benefactor if a little timely help can be given him so that his land may be enabled to carry more sheep to the morgen instead of gradually less, as must be in the majority of cases if left unaided.

Small loans wisely expended will go a very long way towards helping veld restoration in the country generally. Surely the magnitude of the evil and the absolute need for keeping the people on the land on a permanent basis are matters of such national importance as to warrant this subject of veld preservation and restoration being one among the foremost in the Union Parliament when established.

The pity of it all is that so little is done by the sufferers in the direction of combined action in combating the forces producing the downward course. Co-operation in standing needs, and working for helpful measures has lost none of its power but is still an effective force, even more necessary under Union. I am persuaded when more is known about the difference among plants, touching their food value, health-preserving properties, as well as soil enriching, soil retaining and moisture attracting functions, that then the country will realise how great is the loss it has sustained. I know of farms which, forty years ago, were so abundant in rich pasturage that if the stock owner so desired he could have an increase twice within twelve months. The stock on those same farms to-day will barely give one increase in that time, so poor and scanty has the veld become. Droughts have, of course, claimed a share of the veld, but had the present generation of farmers in their youth received a better knowledge of plant growth, the effects of droughts would have been so minimised as not to compare with what has been taken. As an instance the spreading of sluits would have been kept under control, and in other ways the knowledge would have resulted in the adoption of preventive measures individually and by the State.

The average farmer only values—as a stock food—the plants he believes stock eat most. Trees have been lopped that the leaves may be brought within the reach of the animals, but this ends in the destruction of those trees. Then plants of medicinal value are killed off, and diseases are now prevalent on runs at one time healthy. Not that all diseases are ascribable to this cause. Then, again, science has proved that some plants enrich the soil for themselves and for other varieties adjacent. Those valuable plants are also disappearing, and with them the dependent varieties. This fact is no matter for surprise, for is it not common knowledge that Nature maintains growth and fertility by mixing varieties of plant growth? and when man, during long periods, removes some valuable ones and does not replace them with something of equal merit the balance is disturbed, a law is broken and the penalty must be paid. There is no escape. The destruction of the leguminous karoo bush is, together with the disappearance of other allied valuable plants, being keenly felt.

The leguminous karoo I first noticed more particularly when examining an enclosed cultivated plot of natural veld, where under protection the few remaining plants seeded, resulting in hundreds of young plants within a comparative small area. The remarkable spread caused me to forward a sample to Dr. E. Nobbs, and he described it as a leguminous plant.

Time fails now to call to remembrance the great variety of plants the functions of which are many; the roots acting as a means of holding the soil together, preventing its washing away, and the roots of some are more adapted for this useful office than the roots of others, while the moisture-attracting powers of vegetation are a great feature in veld growth. In spite of all this the destruction continues, and one of the greatest agencies in this work is the system of kraaling the stock every night. Would that one united cry would go up till this pernicious habit is stopped! Its evil effects have for years been proclaimed from the house tops, but ears are deaf. This system causes hundreds of thousands of stock to tramp daily to and from the kraals, and by the treading of their countless number of hoofs the particles of the surface soil are closely and firmly packed, excluding (in a great measure) the air and moisture so essential to plant growth, and at the same time producing a maximum of evaporation. No wonder the ground surface, instead of being thickly covered with vegetation, is year by year becoming barer. Thanks to the inventive brain of Mr. Roberts, the rotary cultivator known as the "Lucerne King," has been brought out, which may be used with great profit if the kraaling system is abandoned, because it loosens the surface soil (without disturbing deep-rooted veld growth), allowing air and water to penetrate besides giving the much-needed hold for the tender roots of growing young plants. Of course, the cultivation can only be done where the formation of the surface is suitable, of which there are immense tracts. But what is the use of cultivating to-day and undoing the work to-morrow by tramping the soil by driving stock to and from the kraals?

The hard surface of the soil, after being loosened, is ready for the seed, much of which can be grown and self-sown by the practical method suggested by Mr. Eustace Pillans—of the Agricultural Department—and others, viz., by stock-proof fencing small plots of natural veld at the heads of valleys and other suitable sites allowing a free growth of good plants and seeding within. The seed will be spread by the run of water after rains, by the wind, and other agencies. These are some of the means whereby veld growth could be very greatly increased. There is, however, the absolute need for the propagation of the best kinds only, hence this work of investigation will be of the greatest value, encouragement and help.

The argument has been put up that the cultivator mentioned is too costly and out of the reach of the average farmer. If that be so the purchase could be made by a few clubbing together, each putting in £5 or less. The machine lends itself to this because the principal wearing parts, the tines, are easily removed and readjusted, and each shareholder could keep his own set of tines, and no matter if the one has more cultivation done than another. I know of at least one of these machines bought on this share system.

It is almost needless to add that much good will result from encouraging veld growth and seeding, as just stated, without cultivation, but it stands to reason if the surface is dug up by the cultivator, if only to the depth of a few inches, it must be more beneficial, in fact that has been proved to be the case.

When the Union Government is formed I hope the subject of indigenous plant investigation will form one of its departments. Local information distributed in the locality where collected is necessary, but if all could be

collected at one centre, enabling a distribution (throughout the Union) of the information giving the uses and functions of the best plants and grasses, so much the better. One instance might be given in support of this idea; it is the Bechuanaland wild melon, known as "Magatan," which was for the first time a few years ago introduced into the Midlands of this Colony, and has proved to be one of the most useful stock foods, growing to great size and practically drought proof, as Mr. W. Rubidge and others can testify. Of course, any distribution of plants from one part to another would have to be carried out with care.

I fear I may be misunderstood by some, for there are localities which do not to-day so clearly show the decided veld deterioration that is here spoken of; then in portions of the grass veld the conditions are different, in some respects, when compared with the Karoo and mixed veld.

Yet there is no part where a careful investigation of the veld growth will not be of the uttermost value. The soil of our country is rich, quickly responding to works of improvement and restoration. There can be no doubt about the strong evidences—throughout the country—proving that the deterioration is being year by year more fully realised, and there is almost a corresponding amount of effort directed towards checking the evil, as far as it is recognised, and I am persuaded the work of a Plant Investigator will reveal more distinctly the true position, which will have an exceedingly beneficial effect, and though we have not a Field Botanist, the new appointment provides a necessary forerunner, and I join with those who congratulate the Minister for Agriculture upon the appointment.

SHOW DATES, 1910.

The following corrected list of show dates for 1910 is supplied by the secretary to the Agricultural Union (Mr. A. A. Persse, Parker's Buildings, Capetown):—

Dordrecht : March 4 and 5.

East London : March 4 and 5.

Aliwal North : March 8 and 9.

Craddock : March 8 and 9.

Cathcart : March 8 and 9.

Humansdorp : March 9 and 10.

Grahamstown : March 10 and 11.

Port Elizabeth : March, 15, 16, 17 and 18.

Butterworth : March 18.

Johannesburg : March 29, 30, 31, and April 1.

Oudtshoorn : March 30 and 31.

Kokstad : March 30 and 31.

Elliot : April 5 and 6.

Bloemfontein : April 12, 13 and 14.

AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS.

BEING A COURSE OF LECTURES ON AGRICULTURAL ZOOLOGY, DELIVERED BY DR. J. D. F. GILCHRIST, PROFESSOR OF ZOOLOGY AT THE SOUTH AFRICAN COLLEGE, IN CONNECTION WITH THE TECHNICAL EVENING CLASSES INAUGURATED BY THE SCHOOL BOARD OF THE CAPE DIVISION.

(Continued from Page 59.)

Order IV.—Hymenoptera or Ants, Bees, Wasps, etc.

This order resembles the Neuroptera in having *four wings, usually transparent, but never very large, the posterior pair being smaller than the anterior.* There are also *nervules on the wings but not numerous.* The mouth parts may form a *suctorial proboscis, but the mandibles are well developed.* The females are often armed with a sting, saw or ovipositor. *The metamorphosis is complete and abrupt.*

The Hymenoptera include Ants, Bees, Wasps, Saw-flies, Gallflies, etc. Some of them exhibit a remarkable development of intelligence; another feature, which we shall see is characteristic also of the most highly developed forms of the higher animals, is their provision and care for the young. In some respects the social life of these insects is much more highly developed than that of human beings, the individual, however, being sacrificed to a large extent for the race.

The following families may be noted: Formicidae or Ants, Apidae or Bees, Vespidae and Eumenidae or Social and Solitary Wasps, Tenthredinidae or Saw-Flies, Cynipidae or Gall-Flies, Chalcididae or Chalcid-Flies, Ichneumonidae or Ichneumon-Flies.

Family I.—Formicidae or Ants.

These are Hymenoptera characterised by a very thin "waist," the abdomen being separated from the region in front by one or two much reduced but mobile segments. Some forms have stings and others, not provided with such organs, can cause considerable irritation by their bite, as they inject formic acid into the wound. There are various kinds of individuals in a species—generally winged males and females, and workers (undeveloped females) without wings. Their social life recalls that of the Termites. After the flight of winged males and females they fall to the ground. The male soon dies, and this is the reason why males are seldom found in the nest; the female selects a suitable place in which to lay her eggs, either alone or accompanied by a number of workers. The eggs may be produced by one or more queens, and are carefully tended. The young when hatched out from the egg are very helpless, and the workers, now nurses, carry them about from chamber to chamber according to suitable conditions of heat and moisture; they even feed them from their own

mouths. The young grub-like forms by and by change into pupae, which may or may not be provided with protecting cocoons. These are popularly known as "ants' eggs," and every one is familiar with the state of flurry and anxiety in which the ants carry off their young to places of safety, when their nest is broken into.

The Ant is pre-eminently a social animal, there being no solitary Ants, as there are solitary Bees and Wasps; we find accordingly a corresponding variety of individuals; not only are there various kinds of workers (major workers, minor workers, nurses, soldiers, etc.), but there are different kinds of males and females, for instance working males and females. How all these different forms can be produced from similar eggs has been a subject of much dispute; it would appear to be effected at the will of the Ants, possibly by different methods of nutrition. One peculiar form of individual, found in certain Ants known as "honey-ants," may be mentioned, as illustrating to what length this specialisation may go; the workers collect the "honey," a sweet juice from galls on oak leaves; with this on their return, they first feed the workers in the nest,

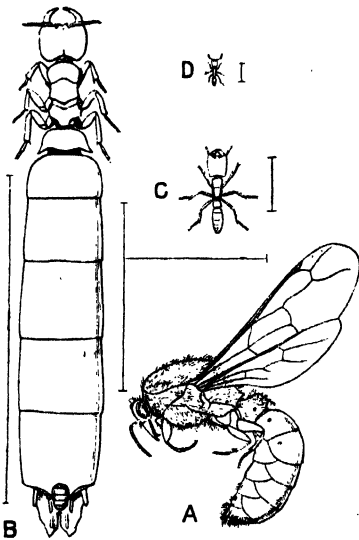


Fig. 85. *Dorylus helvolus*, a common South African Ant. A, male; B, female; C, worker major; D, worker minor. (From the *Cambridge Natural History*, after Emery).

HELVOLUS has a retinue of several degraded forms. The relationships of the ant to its companions is not apparently that of a tyrant to his slaves, but rather a friendly one; some of these companions indeed seem to be rather of the character of retainers, who exist by the charity of the ants.

Though ants eat both vegetables and animal substances, they do little harm. Fruit is sometimes affected and occasionally, as recently in Cape Town and Suburbs, a small black ant, *Iridomyrmex humilis*, an imported species, causes considerable annoyance by invading dwelling-houses in enormous numbers. They may be got rid of by sweetened arsenic. Ants' nests, which are in the form of passages in the earth or in wood, may be got rid of by the application of bisulphide of carbon, as in the case of Termites.

and then hand over the remainder to the honey-bearers, which are specialised as honey-stores. Their abdomen becomes enormously dilated by the enlarged honey crop, and they do not, and indeed cannot move about much, but hang to the roof of special chambers as living honey bags, from which the workers draw a supply when necessary. Such a honey-pot ant (*Plagiolepis trimeni*) occurs in South Africa.

The social life of the ant is not restricted to its own kind, and their household often includes other ants which they have captured as slaves. They keep droves of Aphides (Plant-Lice) and milk them by stroking their back, whereby they are induced to secrete sweet drops from their bodies. Some of them even have attendant beetles. *DORYLUS HELVOLUS* (Fig. 85), which may be seen attracted to the street lamps in Cape Town in large numbers, has a striking male form and a large eyeless, almost Termite-like female. The workers are quite different and, like the Driver-Ants of the West Coast, go out on slave-capturing expeditions. *DORYLUS*

species of beetles of very peculiar and

Family II. —Apidae or Bees.

Bees are characterised by their modified mouth parts, which are adapted for sucking, being usually in the form of a long tubular proboscis by means of which they can suck up the nectar of flowers. The hairs on the body are well developed and branched, and seem to be connected with the carrying of pollen from flower to flower, a service which the bee renders the plant in return for the nectar, though some carpenter bees bite through the base of the flower and thus steal the nectar. The bee also uses the pollen, of which there is always a superabundance, for its own purposes, and carries it on its large hind legs to its nest for food, etc. There are no wingless forms, and the workers are undeveloped females.

APIS MELLIFICA (Fig. 86), the common Honey-Bee, is now, by the agency of man, distributed all over the world, and is abundant in South Africa. There are a number of varieties, of which the German or Black-Bee, and the Italian or Ligurian Bee, are the best known. The former,

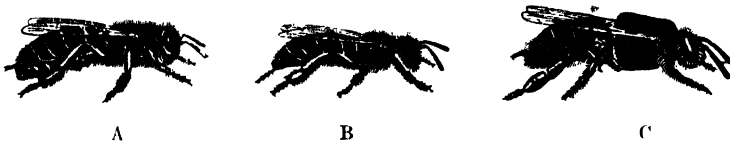


Fig. 86. The common Honey Bee. *Apis mellifica*. A, queen (perfect female); B, worker (imperfect female); C, drone (male). (After Brehm.)

a native of Northern Europe, is large and greyish black in colour. The latter is smaller than the Black-Bee, from which it may be further distinguished by the presence of three bright yellow rings on the abdominal regions in the worker. There are several other varieties, such as the Carniolan, the Himalayan, the Syrian, etc. In South Africa there is a native bee, *APIS CAFFRA*, which is smaller and wilder than the ordinary Honey-Bees, and which varies much in size and markings. There is a very small bee, *TRIGONA*, 3 to 4 mm. in length, in the Transvaal; it makes nests in the hollow branches of trees, and its honey is stored in rather crudely constructed cells.

A new colony of Honey-Bees is started by the peculiar process of swarming, when a great number of workers leave the hive along with the queen, the only occasion in which she leaves the nest. The swarm goes off to some distance, and has nothing more to do with those that have been left behind in the old colony, where provision has already been made for the rearing of a number of new queens; one of these becomes the sole queen of the colony; her claim may not be undisputed by other possible queens, which emerge about the same time, and these she kills. The queen issues from the colony for a time accompanied by drones; she then returns after fertilisation to the hive, and never leaves it again except to accompany a migration swarm. The queen lays the eggs and these develop into workers, drones or queens. The drones are the males, and their sole function is the fertilisation of the female; they take no part in the working of the colony and have no stings. The work of the colony—collecting honey, building combs, nursing the young and caring for the nest—devolves on the workers, which are undeveloped females. The "honey," which is collected is the nectar from flowers; it is at first taken by the bees into their crop, where it undergoes a chemical change, and becomes the sweet honey which is stored in the honeycomb. The comb is composed of numerous hexagonal cells, and these are made of wax, a secretion from special glands on the body of the bee. Propolis is a substance used to fasten the cells, and is collected from buds of certain trees.

The queen lays an egg in each cell. The young, when hatched, are carefully tended and fed by the workers on a mixture of honey and pollen, called "bee-bread."

BOMBUS, the Humble-Bee, has not such a complex social life as the Honey-Bee. It is a large, heavy-built bee and is a useful fertiliser of flowers, being well-provided with hairs to which the pollen adheres. It is stated that the clover plant, imported into New Zealand, did not seed until the bees were also imported. They have a long proboscis, but sometimes it is not long enough for some flowers and they make a hole at the base of the flower which is thus sometimes injured. **BOMBUS** does not occur in South Africa, but its work in nature as a fertiliser of flowers is performed in this country by another bee, **ANTHOPHORA** (Fig. 87A), which has a great development of hairs on the hind legs and thorax, and is thus well adapted for carrying pollen from flower to flower. The tongue or proboscis of *Anthophora* is long and it is thus able to procure honey from flowers with

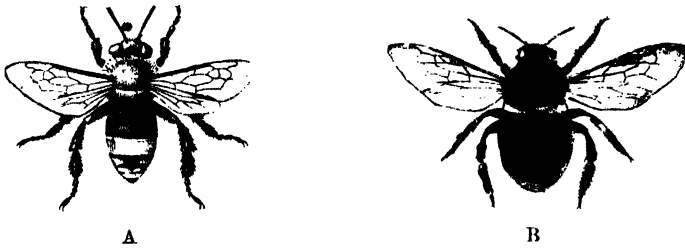


Fig. 87. A, *Anthophora madecassa*, a South African representative of the Humble Bee; B, *Xylocopa lateritia*, a South African Carpenter-Bee.

very long corollas. Unlike the Honey-Bee, its social life is a simple one, there being only males and females, and their nests are mere cylindrical tubes.

XYLOCOPA, the Carpenter-Bee (Fig. 87B), is a large, hairy bee, abundant in South Africa and somewhat resembling *Anthophora*, but instead of securing the nectar from the flowers in a legitimate way, it cuts through the base of the flower and so gets the nectar without rendering any service to the flower. It is one of the largest and most powerful of bees, and certain species (*X. sicheli*, etc., in South Africa) are able to drill large holes into dry wood, such as dead trees and fencing wood. The galleries made in the wood are divided off into cells by partitions, formed from fragments of the wood, cemented together by the bee with secretion from its salivary glands. The male may be distinguished from the female by its lighter yellow colour, and by the fact that it has no sting.

Families III. and IV.—Vespidæ and Eumenidæ or Social and Solitary Wasps.

A wasp may be distinguished from a bee by the fact that, when at rest, its wings are folded longitudinally like a fan. Its body is more slender, and not so well provided with hairs. Though there are social wasps, with male, female and workers, many of them have only males and females and do not produce large broods. A considerable number are solitary, and these are well represented in South Africa.

EUMENES CAFFRA, a South African solitary wasp, builds its nest of clay or pebbles cemented together by clay. Like other such wasps it has an interesting method of providing food for its young; it procures a number of caterpillars, and after paralysing, though not killing, them with its sting, it places them in its mud cells, along with an egg, so that when

the young wasp hatches out it has a supply of fresh food with which to start life.

Some social wasps, such as *Polistes* (Fig. 88), a species of which is common in South Africa, build small papery nests containing only a few cells; others build larger ones, which, however, never attain any great size. The Hornet, *VESPA CRABRO*, is a large, formidable wasp which, however, does not occur in South Africa.

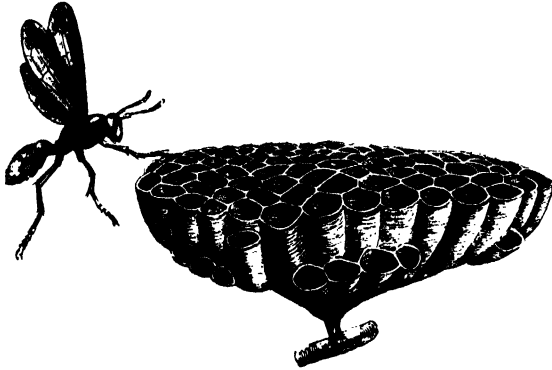


Fig. 88.—A social Wasp, *Polistes*, with its papery nest.

The Digger-Wasps, which are neither Ants, Bees nor true Wasps, and do not belong to the above families, may be noted here as they include the Bee-Pirates, which prey on the Honey-Bee, and are represented by two species in South Africa, against which complaints are frequently

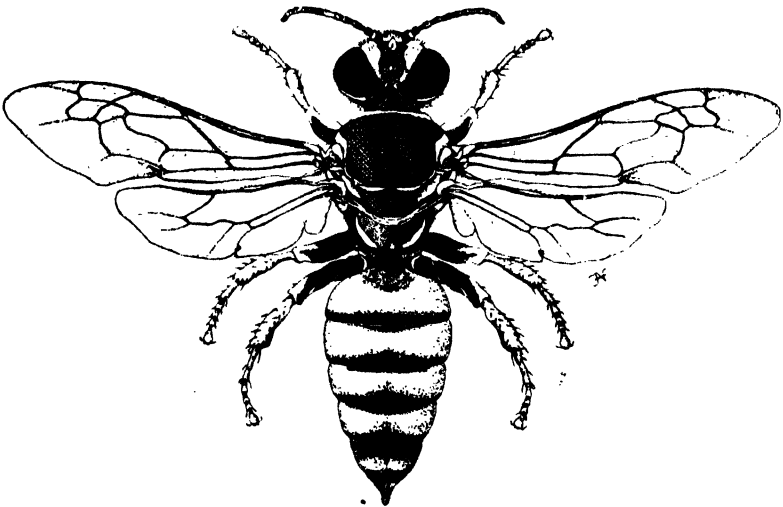


Fig. 89.—A Digger-Wasp, the Bee-Pirate, *Palarus latifrons*.

heard. *PHILANTHUS DIADEMA*, the Yellow Bee-Pirate, of a light yellow colour, digs holes in hard, dry, sandy soil. These are irregular, and may extend a foot or so into the ground. The female alone appears to do the digging, and, when preparing a cell, she slightly enlarges the end of the burrow, and stores up here a number of bees, which have been captured and paralysed. An egg is then deposited, and the mother retreats a few inches, and starts excavating in another direction to form another cell;

about four of these are constructed in each burrow. The burrows are apparently never closed from the outside, but, when a Bee-Pirate alights with a captured bee, she carries it some distance into the burrow, and returns to close the entrance from within. On one occasion Mr. Mally, from whose observations this account is taken, observed a fly keeping very close to a pirate, laden with its captured bee, and attempting to follow it into the burrow; it was, however, quickly ejected and the burrow closed from the inside. At sundown also the burrows are closed and not opened till 8 or 10 o'clock next morning. This Bee-Pirate does not appear to capture its prey at the hive, but while at work collecting honey. For this reason probably it is not so well known as another South African Bee-Pirate, viz.:

PALARUS LATIFRONS (Fig. 89), the Banded Bee-Pirate, or Bee-Tiger, which carries on its work of depredation near the bee-hives, capturing the

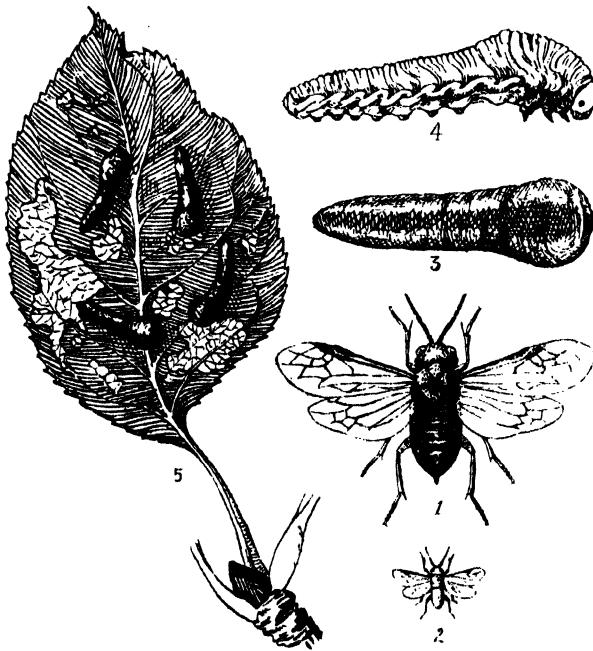


Fig. 90.—The Pear-Slug, *Eriocampoides limacina*, 1, adult insect (enlarged); 2, natural size; 3 and 4, two views of larva or "slug" (enlarged); 5, slugs on pear leaf. (1898 Ann. Rep. Cape Govt. Entomologist).

incoming or outgoing bees. To get rid of Bee-Pirates Mr. Mally recommends placing a white plate or basin containing water with a little paraffin oil added, near the hive; the wasps, apparently attracted by the glistening surface, are usually caught, but the bees seldom.

Family V.—Tenthredinidae or Saw-Flies.

All the families of the Hymenoptera which we have considered are provided with stings. This family is characterised by the possession of a saw-like organ in place of a sting, and, by this means, they are able to make an incision in the stem or leaves of a plant in which the eggs are laid. The larvae feed voraciously on the leaves and even the fruit. An example of the family is well known to keepers of orchards in South Africa, as, when not controlled, it defoliates pear and plum trees. The damage is

done by the slug-like larva and not by the adult insect. It is called the Pear or Plum-Slug. *ERIOCAMPOIDES LIMAÇINA* (Fig. 90). It is an introduced form, the native representatives of this family being few in number.

Family VI. - Cynipidae or Gall-Flies.

The eggs of these are laid in the epidermis of plants, and, as they develop, they cause a growth or gall which surrounds the larvae. The galls on the oak trees are formed in this way. The galls formed by some insects may become separated and assume a pea or egg-like appearance, and the movements of the larvae cause it to leap or jump into the air in a very mysterious manner, such galls being known as jumping peas or eggs. Such objects are found on the stem and leaves of *Rhus* in South Africa, but contain the larvae of a moth.

Family VII. - Chalcididae or Chalcid-Flies.

These are mostly parasites preying on other insects, many of which are injurious to the crops, so that the chalcid-flies are beneficial to the agriculturist. Some of the most interesting of the family are the fig-insects such as *BLASTOPHAGA*, which appears to be essential for the ripening of the cultivated fig. The insect enters the fig and lays its egg in its ovules, thus producing a gall. It is supposed that the maturing of the fruit is brought about as a result of the fertilisation of the fig by the entrance of the insect carrying pollen with it. The *Blastophaga* has been successfully introduced into South Africa by Mr. Lounsbury, the Cape Government Entomologist, who has also supplied to California from South Africa a Chalcid wasp, *Scutellista*, to keep down the black scale insect, thus affording some return for the obligation of the Cape to that country for the *Vedalia*, to be noted below under the Hemiptera.

Family VIII. - Ichneumonidae or Ichneumon-Flies.

These are parasites, and lay their eggs in the body of larvae of various other insects. When the egg hatches the young feed on the tissues of its host, as a larva in or on a larva. After thus growing at the expense of their host, they become pupae within or on its surface. Various injurious insects, such as the Aphidae, are parasitised by these Ichneumons, which are therefore beneficial to man.

Order V. - Coleoptera or Beetles.

The Beetles possess *two pairs of wings*. The anterior (called *Elytra*) are hard and horny, and fit closely to each other along the middle line; they are useless for flight, and often present remarkable sculpturings, whose significance is not known. They protect the posterior pair which are membranous and folded up under them. The mouth is adapted for biting, being provided with mandibles. *Metamorphosis is complete and very abrupt*, the typical three stages of insects being well illustrated. The larva is called a grub or maggot, and is destitute of legs, or with three pairs of small thoracic legs only.

Judging from the success of the organisation of the beetle, as indicated by the number and variety of its different forms, a weak point in the ordinary flying insect is the protection of its wings, and the hard shell-like anterior wings of the beetles doubtless enable them to cope, on more equal terms, with other terrestrial forms, while they are still able, when occasion requires it, to fly in the air. The inconvenience of their hard, stiff covering is rendered less by the pro-thorax being well developed and freely movable.

The order is of great importance from an economic point of view, many of its representatives being formidable foes, though several of them are valuable friends of the agriculturist.

Family I.—Scarabeidae, Lamellicornia or Chafer-Beetles.

The name Lamellicornia refers to the lamellate or leaf-like appearance of the antennae, the terminal joints of which are expanded on one side. Their grubs or larvae are frequently found under stones, or in turning



Fig. 91.—British Cockchafer, Grub and Chrysalis. (Ormerod).

over the soil, and are large, whitish in colour, and when exposed, lie helplessly on their side (Fig. 91). The pupae may also be found enclosed in cells made of earth. The young sometimes feed on roots, and the adults on vegetable matter, often causing considerable damage.



Fig. 92.—South African Chafer-Beetles. A and A', the Mealie-Chafer, *Eriesthis stigmatica*; B, the Wattle-Chafer, *Hippopholis sommeri*; C, the Keever Beetle, *Heteronychus arator*, (from *Some Injurious Insects of South Africa* by E. A. Ormerod).

ERIESTHIS STIGMATICA (Fig. 92, A and A'), the Mealie-Chafer, is an example of the family. It is injurious to mealie crops, and has been recorded as destroying them from near Fort Beaufort right down to the Fish River mouth, and as the worst pest in the country for mealies (Ormerod). *HIPPOPHOLIS SOMMERI* (Fig. 92, B), the Large-Wattle-Chafer, defoliates plantations of wattle in Natal, is injurious to vines, and destroys roses. *HETERONYCHUS ARATOR* (Fig. 92, C), the Keever-Beetle, is very injurious to the roots of growing grain. It is widely distributed and is one of the most destructive of insects in South Africa.

The "Rose chafers" of England (sub-family Cetonides) are represented by many genera and species in South Africa. Many of them are of elegant form and beautiful colour. *RHABDOTIS SEMIPUNCTATUS* (Fig. 93, A and A') is an example common in South Africa. It has a bright green body with well-defined lines and spots. It is a serious pest of figs and peaches, as well as of blossoms of apples and plums. An aberrant form is the Mealy-Bug-Chafer, *MACROMA COGNATA* (Fig. 93, B), which feeds on mealy-bugs and soft-scale insects.

Many beetles are found on flowers such as the Protea-beetles (*Anysonyx*, etc.), and being, like bees, provided with hairs, doubtless render an important service in fertilisation, though some, like *ADORETUS*, also a flower-beetle, cut through the flower to get the honey.

Belonging also to this family is the interesting group of the Scarabæini or Roller-Beetles, remarkable for their peculiar habit of rolling the droppings of cattle and other animals into balls, often larger than themselves. These they roll along by pushing with their powerful hind legs or pulling

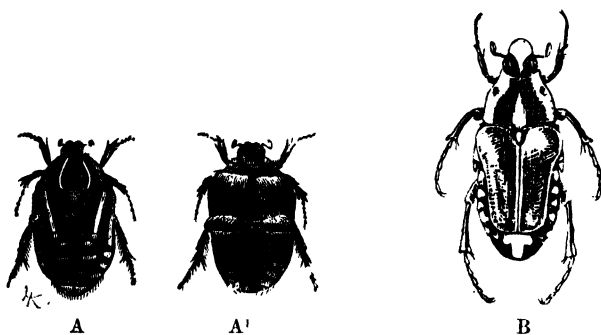


Fig. 93. A and A', upper and under side of *Rhabdotis semipunctata*; B. the Mealy-Bug chafer, *Macromia cognata* (from Fuller).

with their forelegs. Their industry and perseverance in this peculiar occupation is very remarkable, and, should the object aimed at be unknown, very mysterious. It is said that they were regarded as sacred by the ancient Egyptians on account of their peculiar behaviour, and many of the stone scarabæi found on Egyptian tombs represent some forms of this group. If the operations of the beetle be watched, it will be found that, after a suitable place has been reached, it digs a hole, buries its treasure-trove, and either devours it at its leisure or deposits an egg in the mass, from which the young on hatching can procure nourishment.

Family II.—Coccinellidae or Lady-Birds.

These small beetles, often brightly coloured, are among the most useful insects to man. They have few enemies, increase rapidly, and prey upon plant-lice, scale insects and mites, which are injurious to cultivated plants. One of the most valuable and interesting achievements in entomological work in South Africa was the introduction of *VEDALIA* (*NOVIUS*) *CARDINALIS* (Fig. 94), a lady-bird, which, in its native habitat (Australia) preys on and keeps in check the Australian-Bug, generally known as *Dorthesia* (*Icerya purchasi*). This Australian-Bug seems to have been introduced into the Cape about 1873, when it was observed in Cape Town. Within five years from that date, it had become a severe garden pest, within the town and suburbs, and by 1885 it occurred almost all over the Cape Colony. Orange and other citrous and black wood were attacked and had to be cut down on nearly every estate throughout the South-West district.

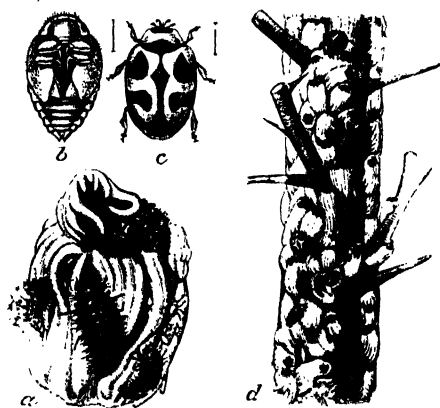


Fig. 94. — The imported Lady-Bird, *Novius* (*Vedalia*) *cardinalis*, which keeps in check the Australian Bug. a, larvae feeding on Australian Bugs (enlarged); b, pupa and c, adult (enlarged); d, orange twig with Australian Bug and various stages of lady-birds. (Marlatt in 1896 U.S. Dept. Agr. Year Book.)

In 1891 the Cape Government took steps to introduce the natural enemy of the pest, the *Vedalia*, and this was successfully accomplished. It attacked the *Dorthesia*, and increased rapidly, until now a natural balance has been established, and both are rather scarce in South Africa.

There are a number of native lady-birds in South Africa, such as *CHILOMENES LUNATA*, a large, conspicuous form common at the Cape, but these did not take to the new source of food supply afforded by the Australian-Bug. An exception, however, to this was a native form, *AULIS FAEDATA* (*RODOLIA ICERYAE*), which is found in the Eastern Province, and which attacked the introduced pest and at least kept it in check.

All kinds of lady-birds are not, however, beneficial to man, and one, *EPILOCHNA SIMILIS*, devours mealies and grasses.

Family III.—Ptinidae or Paste-Beetles, Biscuit Weevils, etc.

These are very destructive to dried animal matter. *SITODREPA* (*ANOBIUM*) *PANICEUM* (Fig. 95), known as the Paste-Beetle, Boot-Beetle, or Biscuit-Weevil, is not at all particular as to its food. It attacks books, boots, etc., and has been known to thrive on a diet of opium. "Weevily" biscuits usually are infected by the grub of this beetle. Another species,

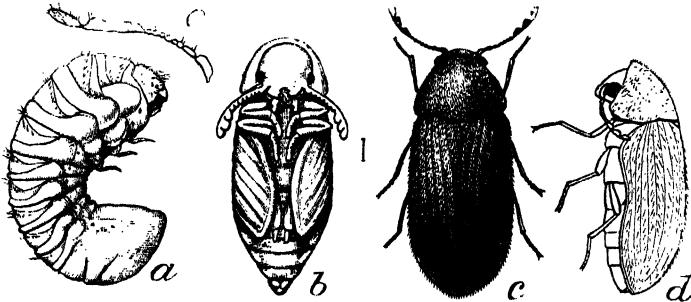


Fig. 95.—The Paste Beetle or Biscuit Weevil *Sitodrepa* (*Anobium*) *paniceum* : a, larva ; b, pupa ; c and d, adult. (Howard in 1898 U S. Dept. Agr. Year Book.)

A. STRIATUM, is the cause of "worm-eaten" furniture, and has the peculiar habit of calling to its mate by striking its head against the wood in which it is boring. It is known, as already mentioned, as the greater death-watch.

Family IV.—Elateridae or Click-Beetles.

The larvae of these beetles are the "wire-worms" of Europe and America. In these countries they do considerable damage to vegetation, but are not known to give much trouble in South Africa. The adults are called "Click-Beetles" on account of the peculiar habit they have of lying on their back and suddenly jerking themselves into the air with a clicking noise. They can of course be readily distinguished from some parasitic worms, like *Strongylus* and a myriapod (by the number of legs), which are often called "wire-worms" in South Africa.

Family V.—Cantharidae, Meloidae or Blister-Beetles.

So called because many of them possess a substance which is capable of raising a blister when applied to the human skin. They are represented in South Africa by the genus *MYLABRIS*, some species of which destroy flowers and fruit, particularly of leguminous plants as well as potatoes and lucerne.

Family VI.—Bruchidae or Bean-Weevils.

These are often called Weevils although they belong to a different family from that of the true Weevils, and resemble them only in some of their habits. They are the Bean- and Pea-Weevils, and destroy the seeds of these plants in their maggot or larval stage. The larvae are stout, and without feet, when in the pea. They first burrow in the pod of the pea, on which the eggs have been laid by the adult, and it is only afterwards that they loose their legs and enter the seed. Infected seed may be detected by the fact that it floats in water. The larvae may be killed in these by fumigating with carbon-bisulphide or by immersing in boiling water for one minute. *BRUCHUS PISI*, the Pea-Weevil, and *B. OBTECTUS*, the Bean-Weevil (Fig. 96) are examples of the family.



Fig. 96.—The Bean Weevil, *Bruchus obtectus*, a, enlarged; b, infected bean. (After Riley, from 1882 Rept. Sec. U.S. Dept. Agr.)

Family VII.—Chrysomelidae or Colorado Beetles, etc.

To this family belongs the notorious Potato- or Colorado-Beetle, which caused such great destruction of potato crops in North America. Most members of the family live on foliage, which some destroy by mining in the leaves. They are often known in South Africa as “lady-birds” to which they have a superficial resemblance. Examples are *CHRYSOMELLA IMMACULATA*, *HALTICA INDIGACEA* (the Blauw biesje found on vines. etc.).

Family VIII.—Cerambycidae or Longicorns.

They are so called because they usually have long antennae. They mostly live in or on wood, though some occur in herbaceous plants. In some cases the larvae can live for a long time, and it has been recorded that a Longicorn has issued from the wood of a table over twenty years after the felling of the tree. *PHORACANTHA* is a Longicorn which has been introduced into South Africa, probably in sleepers, and works in Eucalyptus trees. It does extensive damage, though probably not to healthy fullgrown trees. *PHRYNETA SPINATOR* is a fig-tree Longicorn. *CEROPLIS BICINCTA* (Fig. 97) is a handsome and common representative of the family in South Africa.

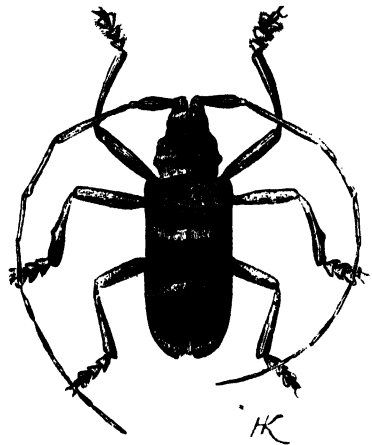


Fig. 97.—A common South African Longicorn Beetle, *Ceroplessis bicincta*. (Ormerod.)

Family IX.—Curculionidae, Weevils or Snout-Beetles.

These are generally characterised by their long snout or beak, which sometimes grows to a great size, but may be absent. The grub of the Weevils are great vegetable feeders and attack wood, bark, flowers, buds, etc., indiscriminately. The chief weevil pest in South Africa is *CALANDRA*

ORYZA, a grain weevil (Fig. 98, d). It is a small beetle, and attacks chiefly stored grain. The grub hatches out on the grain, feeds and pupates within it, and emerges from it as an adult weevil. There is another weevil,

usually called by farmers "the Calander," probably from its resemblance to the preceding. It is a different form, *PHLYCTINUS CALLOSUS*, and attacks vines.

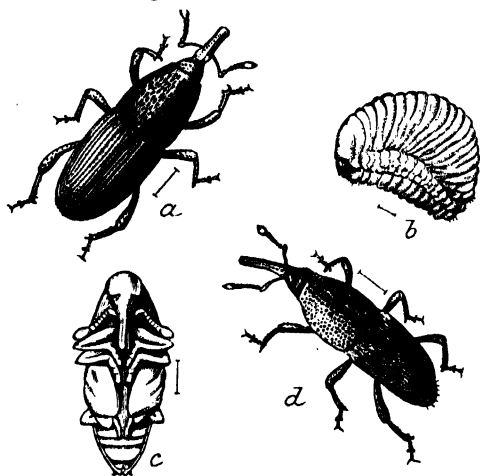


Fig. 98.—Grain Weevils. *a*, *Galandra granaria*, adult; *b* and *c*, larva and pupa of same; *d*, *Calandra oryza*, adult. (Chittendam in 1894 U.S. Dept. Agr. Year Book.)

larvae attack wheat, oats, barley and maize.

Family X.—Tenebrionidae or Darkling-Beetles.

These are dark in colour, and shun the light. They are vegetable feeders, and are said by farmers in South Africa to injure vines. A familiar example is the Toktokje. *PSAMMODES* (Fig. 99), well known in South Africa for its habit of producing a very audible knocking noise, by striking its abdomen on the ground. It is usually heard towards dusk or at night. The

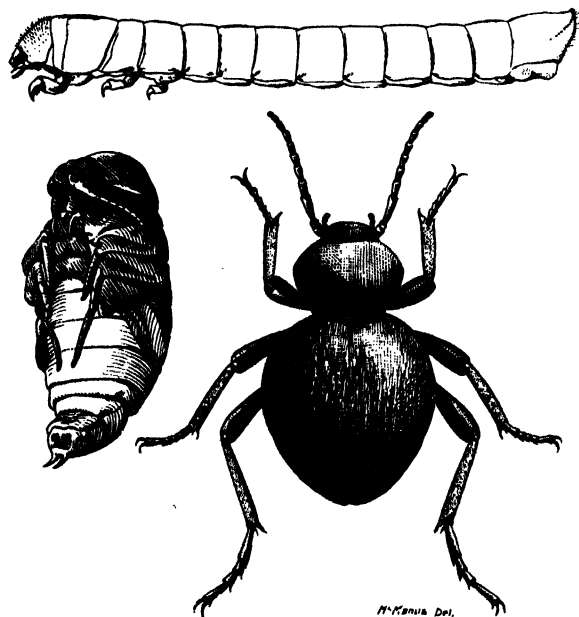


Fig. 99.—The Toktokje, *Psammodes*, the adult, pupa and larva, which attacks wheat, oats, barley and maize.

The foregoing are a few only of the families of the order Coleoptera or Beetles. Three others may be mentioned: the CARABIDAE or Ground-Beetles, which are almost entirely terrestrial, being scarcely ever seen on

the wing; they are carnivorous and attack living insects, worms, etc., though a few have been found eating growing corn; the BUPRESTIDÆ, of brilliant colour, the larvae of which eat living vegetable matter, and some form galls on the bark of trees and bushes and on roots; the CICINDELIDÆ or Tiger-Beetles, which are very active, can run and fly rapidly, and are "the most voracious and fierce of carnivorous beetles." The South African *Manticora maxillosa* is an example of the Tiger-Beetles, and is characterised by the greatly developed mouth parts, the mandibles especially being very large.

Order VI.—Lepidoptera or Butterflies and Moths.

This order has *two pairs of well-developed and similar wings covered with scales* of various colours. The mouth parts of the adults are adapted for *sucking only*, the maxillae being modified into a long spirally coiled tube, while the mandibles are rudimentary and incapable of biting. *Metamorphosis is complete and very abrupt.*

This order forms a well marked contrast to the preceding. The wings are the most characteristic feature; they are large, without however apparently increasing the power of flight, and are usually so conspicuously and gaudily coloured that they do not contribute to the safety of their possessor. The life of the winged adult is indeed usually a short one, and chiefly concerned with the reproduction of the species; many take no food, and others only small quantities of the nectar of flowers, juices of plants or fruits. The danger of detection by enemies, as a result of their large, conspicuous wings, is, however, minimised in some cases by striking instances of mimicry. A well-known instance is that of an Indian butterfly, *KALIMA*, in which, while the upper surface of the wings is conspicuously coloured, the under surface has the closest resemblance to a withered leaf, so that the insect, when it settles in a tree and closes up its wings, can with difficulty be distinguished from a dead leaf. Other examples almost as striking are to be found in South Africa. An interesting form of mimicry is that in which a butterfly, protected by its distastefulness to its enemies, appears to be mimicked by another not so protected.

The larvae of the Lepidoptera, commonly called caterpillars, are longer lived; they are usually vegetable feeders, are provided with strong mandibles, and may (especially moths) be very injurious to vegetation. They appear to live mainly on the juices of plants, and hence may consume large quantities of vegetation, often defoliating large areas of forest trees. They have six legs, the true or thoracic legs of the adult, and usually four pairs of false legs or pro-legs and an anal pair. After moulting several times, the larva enters a resting stage, and becomes a pupa or chrysalis. In the Lepidoptera the resting stage is usually short and the pupal stage long, being passed within a more or less perfect covering of hard chitinous material.

The Lepidoptera may be divided into two sub-orders: —I. RHOPALOCERA OR BUTTERFLIES, and II. HETEROCERA OR MOTHS.

SUB-ORDER I.—RHOPALOCERA OR BUTTERFLIES.

This suborder has the antennae knobbed at the tip, and the wings are held vertically when in repose. One family may be noted:

Family.—Papilionidæ.

This family, considered to be the highest of the butterflies, includes some of the finest forms, as well as a few of economic importance. The

common Swallow-tail or Orange-tree Butterfly, *Papilio demoleus* (Fig. 100), is one which, in its caterpillar stage, does considerable damage to orange and other citrus trees. This beautiful butterfly, which is common throughout South Africa, may be taken as a type of the group. It can easily be

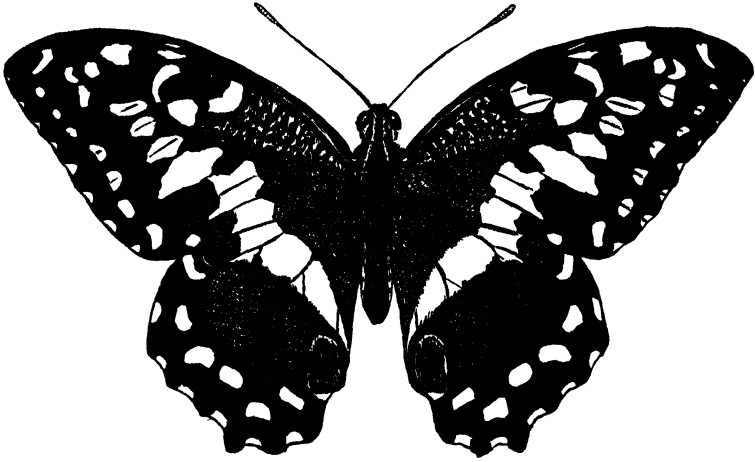


Fig. 100.—The Orange-tree Butterfly, *Papilio demoleus*, the larva of which destroys orange and other citrus trees. (*Injurious Insects of South Africa*, E. A. Ormerod).

recognised by its black colour, with sulphur yellow spots and bands, and two eye-like spots on the hind wings. The eggs are laid singly on the branches or leaves, and from them hatch out the larvae, which, when fully grown, are of a pale yellowish green colour, with marblings and spots of

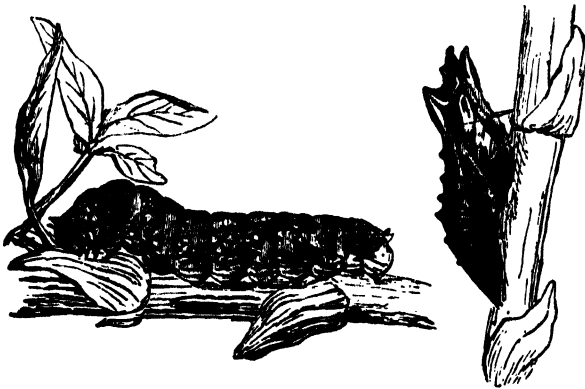


Fig. 101.—The larva or caterpillar and the pupa or chrysalis of *Papilio demoleus*. (Ormerod after Trimen).

grey and purple. When the animal is irritated a crimson Y-shaped tentacle-like organ, emitting a pungent odour, is thrust out from the region above the head. After the larva has fed and grown to full size on the leaves, it finds its way to a place on the branches towards the centre of the tree, and here it sheds its skin and becomes a chrysalis (Fig. 101). This

is fastened to the branch in an upright position, the posterior end being secured by a network and the anterior end by a band of silk, spun by the caterpillar itself.

COLIAS ELECTRA (Fig. 102), the larva of which is sometimes called the Lucerne Caterpillar, is another common South African butterfly, which does considerable damage. The caterpillar is green like the lucerne, with a conspicuous stripe along each side, and a dark green stripe along the back. The chrysalis is attached to the leaf or stem, and is of a pale greenish yellow with dark streaks. After four or five days the imago or adult form emerges, with wings of a bright orange yellow edged with black.

PYRAMEIS CARDUI, the Painted Lady, may be mentioned as a type of non-injurious butterflies. It is common in South Africa, and is also found in Europe, being probably the most cosmopolitan of all butterflies.

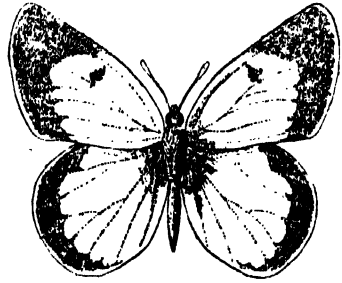


Fig. 102.—*Colias electra*, the Butterfly or adult of the Lucerne Caterpillar. (From *First Report* of Claude Fuller.)

(To be continued.)

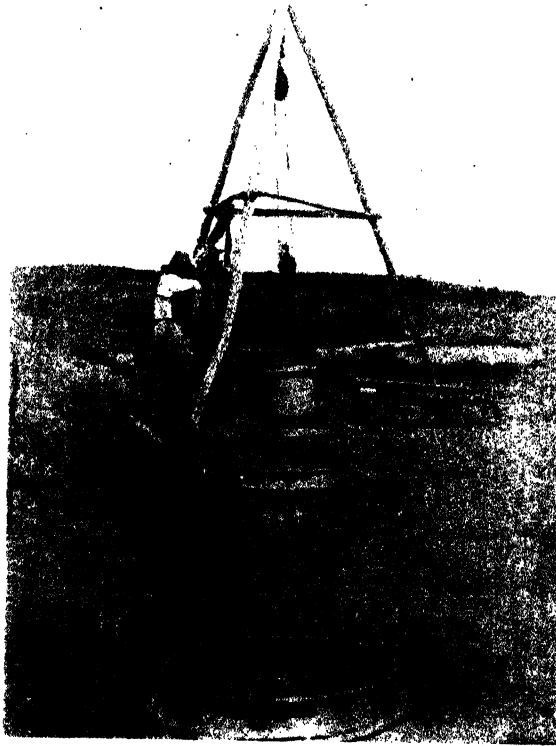
SOIL EVAPORATION.

EXPERIMENT AT ROBERTSON EXPERIMENT STATION, SHOW- ING SOIL MOISTURE CONSERVED BY CULTIVATION.

REPORT No. 1.

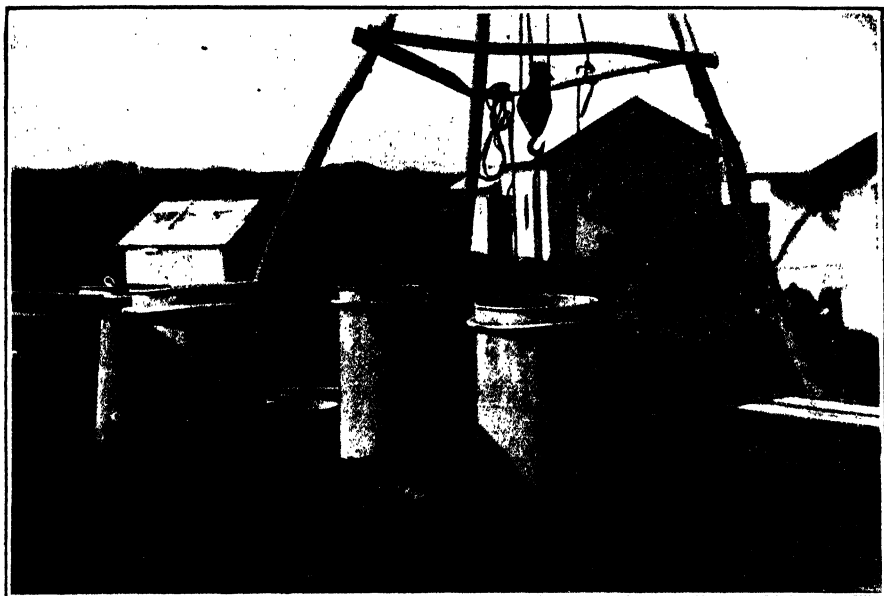
By R. W. THORNTON, Government Agriculturist.

For many years soil evaporation experiments have been conducted in the United States of America with a view to helping the irrigation and the dry land farmer, and with the advent of dry land farming operations

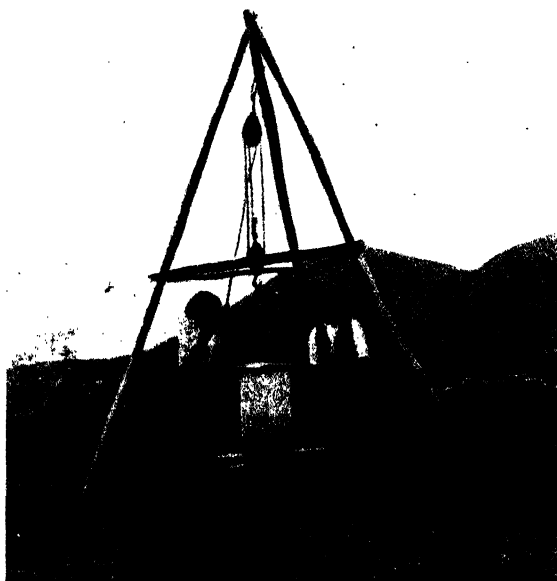


Illustrating inner drum being drawn up for weighing, also drums sunk in a row in the ground. Note rim of inner drum being drawn out.

in this country it is necessary to obtain data of our own. With this object in view evaporation experiments were started at the Robertson Experiment Station during September, 1909, and since continued. This report deals with the results of the first 30 days' work and each subsequent report will deal with a similar period. The appliances used are those which have given the greatest satisfaction in America, consisting of water-tight double drums (see illustration). Eight sets of drums were used. The inner drums measured 17 inches across and 30 inches deep, and the

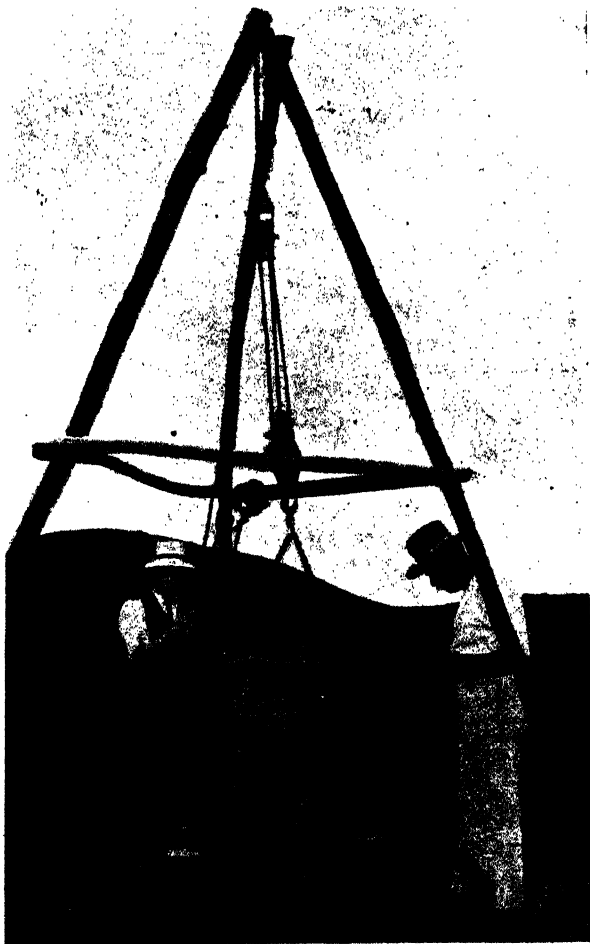


Shewing inner drums taken out to be filled with soil. Note man bending over outer drum sunk into the ground.



Shewing method of weighing inner drum.

outer drums 19 inches across and 30 inches deep. The outer drums act as a casing for the inner ones, and are filled with water through a hole made in the supporting flange of the inner drum. The outer drums were sunk into the ground until the edges were level with the surface of the ground. In each case the inner drum's edge protruded above the ground surface very slightly, being supported by its flange on the edge of the outer drum. The inner drums were filled with soil to the level of the edge of the outer drums. The eight double drums used were sunk in a row into the ground (see illustration). The method of weighing these



A nearer view of weighing the inner drum. Note the truck scale.

drums was as follows:—A movable tripod made of three poles was placed over the drums with a pulley block and tackle attached to it. A hook was attached to the pulley which hooked into the two lugs of the inner drum. By means of the pulley the inner drum was drawn up and then lowered on to a truck scale which was pushed under it. After weighing, the drum was dropped into place again. This weighing was carried out every morning at 8 o'clock.

Een Getuigschrift van een welbekende Vrijstaatse Schaaap Boer.

McDougall's "Leeuw" Merk Tabak Extrakt.

DE HEEREN McDougall,

Ik heb het genoegen U mede te delen dat ik hoogst tevreden ben over uw Leeuw Merk Tabak Extrakt. Enige maanden geleden gebruikte ik het om 3,000 schapen te dippen. Door dat eenmaal dippen werden ze genezen en sedert die tijd zijn ze vrij van brandziekte gebleven. Het dip was gemengd volgens gebruiksaanwijzing, n.l. een gallon extrakt tegen 150 gallon water.

Ik heb bij vorige gelegenheden andere Nicotine Merken geprobeerd, maar niet een daarvan was zo succesvol als uw "Leeuw" Extrakt. De schapen hebben niet het minst erdoor geleden, en evenzo de wol.

"Lion Brand" Tabak Extrakt kan ik het aan andere boeren aanbevelen om het te proberen.

VLARKONTEIN, TROMPSBURG,
22/1/1909.

(get.) C. J. VISSER.

Een Getuigschrift uit Beaufort West.

BEAUFORT WEST,
29ste October, 1907.

DE HEEREN McDougall GEBROEDERS,
Oost Londen.

MIJNE HEEREN,

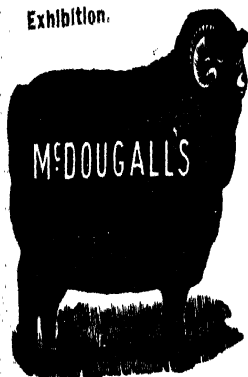
Ik heb het genoegen u te melden dat ik een kistje van McDougall's "Leeuw" Brand Extrakt van Tabak op twee troppen Afrikaner Hamels (1,700) gebruikt heb. Een trop was erg met brandziekte besmet, en daar het mijn begeerte was de schapen voor slaggoed te verkoopen, wou ik geen dip gebruiken die twee indompelingen zou noodig hebben om de brandziekte te geneezen, daar ik de schapen in goede conditie wou bewaren. Hier verblijdt mij dat ik uw raad gevolgd heb en "Leeuw" Brand probeerde. Een dipping geneesde de brandziekte. De schapen werden drie weken daarna geinspecteerd, en weer een veertien dagen later, maar alle teekenen van brandziekte waren verdwenen. Zes weken geleden verkocht ik de schapen en kan melden dat zij niet in het minste hadden afgenomen. Ik kan dus "Leeuw" Brand Extrakt van Tabak aanbevelen als een Uitnemende Dip voor Slagt en Aanteel-vee.

Uw dienstwillige dienaar,

A. VERSTER.



3 Gold Medals
St. Louis
Exhibition.



THE BEST
NICOTINE
DIP.

used by Mc DOUGALL'S VLOEISTOF.



Mc DOUGALL'S
OLD ORIGINAL
LIQUID DIP
(COLD WATER QUALITY)
NON POISONOUS
APPROVED FOR SCAB-1 GALLON TO 80 GALLONS WATER



Established
Nearly
70 Years.




WE USE
Mc DOUGALL'S
DIPS

THE BEST
NICOTINE
DIP.



LION BRAND TOBACCO EXTRACT.

Soil for drums.—The soil for the drums was taken from the same plot and the different layers of soil, as found in the field, occupied the same positions in the drums as in the field. The proper degree of compactness was obtained by lightly stamping every two inches of the soil as it was put into the drums. The maximum daily temperature of the atmosphere surrounding the drums was taken regularly, and also a daily weather report including rainfall, the rain-gauge being erected only a few feet from the drums. The experiment conducted was as follows:

Drums Nos. 1 and 2 received a wetting equivalent to a 4-inch watering, Nos. 3 and 4 equivalent to a 6 inch watering, Nos. 5 and 6 equivalent to an 8-inch watering, and Nos. 7 and 8 the equivalent of a 10-inch watering. The latter two drums were struck out of the experiment due to an unforeseen mishap. The even numbers, that is drums Nos. 2, 4 and 6, received a uniform cultivation, when dry enough, to a depth of 4 inches. The soil used was ordinary red Karroo, and, to test its water-holding capacity three pounds of soil were taken and dried by artificial heat. This soil lost $5\frac{1}{4}$ ozs. of moisture or 10.9 percent of its total weight.

The accompanying table gives the results, which are better illustrated by the diagram following:—

Date. Septem- ber.	Weight of drums Nos.						Maximum daily Tempera- ture.	Daily Weather Report.
	1	2	3	4	5	6		
1	384	390	396	394	415	415	60°F	Cloudy and rainy.
2	384	390	399	394	413	416	62	Cloudy.
3	383	390	399	394	412	415	72	Clear, fine.
4	382	390	398	393	411	414	70	do.
5	382	390	398	392	410	411	80	do. (warm).
6	381	390	396	392	409	413	78	Cloudy, .1" rain.
7	380	389	395	392	408	412	60	Overcast.
8	379	390	395	392	407	410	70	do.
9	380	388	395	392	404	408	68	do.
10	380	388	395	392	404	408	68	do. .485" rain.
11	381	389	395	392	406	408	60	Wet.
12	384	392	399	395	410	412	60	Cold.
13	384	392	399	395	410	412	58	Wet, .52" rain.
14	385	393	399	395	410	412	68	Cool, .05" rain.
15	384	393	399	396	409	412	70	Clear.
16	383	392	398	395	407	411	88	do.
17	382	392	398	393	406	410	79	do.
18	382	391	396	392	405	408	75	Cloudy.
19	381	390	394	392	405	407	72	do.
20	380	390	392	390	401	404	70	Clear.
21	380	390	392	390	401	404	80	do.
22	380	390	392	390	400	403	90	do.
23	380	390	391	390	398	400	79	do.
24	378	390	389	390	397	399	60	Cloudy.
25	378	390	389	390	396	399	60	do.
26	378	389	388	390	394	398	68	Clear.
27	377	388	386	388	391	398	70	Cloudy, .025" rain.
28	376	388	386	390	390	396	70	do.
29	376	388	386	390	390	396	80	Clear.
30	376	388	386	390	390	396	60	Cloudy.

Explanation of Chart.—In starting this chart, due to the variance in the weights of the respective drums of soil, a common factor was taken for each pair, and the gain or loss of moisture is indicated by a rise or fall in the chart respectively. The heavy lines represent the uncultivated drums, Nos. 1, 3 and 5, whereas the dotted lines represent the cultivated

drums, Nos. 2, 4 and 6. The lower pair of lines (starting at figure 9) represent drums Nos. 1 and 2, the second pair starting at figure 19 represent drums Nos. 3 and 4, and the third pair starting at figure 39 represent drums Nos. 5 and 6. The figures one to 40 represent the scale of pounds and those from 1 to 30 the days of the month. Thus, to read the chart, if we take for example the day of the month as the 7th, we

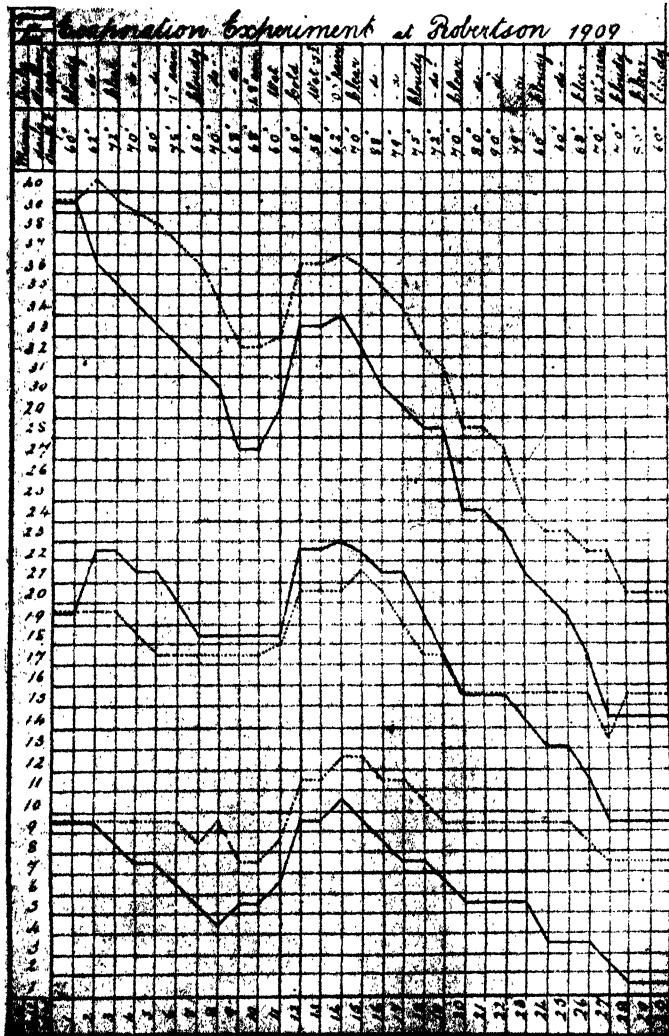


Chart illustrating results for September.

find that drum 1 lost one pound of water, Drum 2 lost one pound, Drum 3 lost $1\frac{1}{2}$ pounds, Drum 4 lost no moisture, Drum 5 lost one pound and Drum 6 lost one pound. Although it rained the day previous, the heat on that day was sufficient to reduce the weight by evaporation.

In looking at the chart the first thing our attention is drawn to is the gain of the cultivated drums in all cases over those that were not cultivated. In the case of Nos. 1 and 2, the moisture saved by cultivation

is 6 lbs., which is equal to .61 inches of rainfall or a watering of 16,607 gallons per acre. The total loss of the uncultivated drum is 8 lbs., equal to .81 inches of rainfall, 20.4 per cent. or a watering of 22,264 gallons per acre, whereas the loss of the cultivated drum was only 2 lbs., and as 39 lbs. were originally added the loss is very small, amounting to 5.1 per cent. In comparing Drums 3 and 4, which received a 6-inch wetting, the difference between the cultivated and uncultivated drums is the same as in the case of Nos. 1 and 2, i.e. 6 lbs, but the total loss is very much greater, being in the uncultivated drum, 10 lbs. equal to 1.02 inches of rainfall, 27,779 gallons per acre or 17 per cent. of the amount added, and in the cultivated drum 4 lbs., 6.8 per cent or 11,107 gallons per acre. In comparing Drums Nos. 5 and 6 which received a wetting of 8 inches, the loss is very great, but the cultivated shews to the fore, having again six pounds less loss than No. 5, or the uncultivated drum. Taking the loss as a whole, we find that No. 5 drum lost a total of 25 lbs. equal to 2.5 inches of rainfall, 32 per cent. or 68,062 gallons per acre. Thus it would appear to be of greater advantage to apply small wettings of 4 inches each per month, when the loss would only amount to a total of 16 lbs. instead of 25 lbs. in the uncultivated drums and 4 lbs. instead of 19 lbs. in the cultivated drums. In comparing the three sets of drums we find that Nos. 5 and 6 lost considerably more in the first week than the other two sets. This would be on account of the saturated condition of the soil which would expose more moisture to the atmosphere than the drums which received less water. Another thing to notice is that on cloudy *cold* days the loss by evaporation was very small or none at all, whereas on a cloudy day, with a high temperature, evaporation still continued.

A glance at the chart will illustrate the benefit derived from cultivation, as all three cultivated drums lost far less water than the uncultivated ones. The sudden rise in all the drums on the 11th was due to the heavy rainfall on that date, and rather detracted from the value of the experiment.

From the results of this experiment it is clearly shewn that a vast amount of moisture can be saved by cultivation, amounting in the cool month of September to over half an inch of rainfall, though there is little doubt that the evaporation during the heat of summer will be very much higher, but even taking half an inch per month gives a total of 6 inches per annum, which is an amount that cannot be despised. This experiment shews the great benefit derived by cultivation in dry land farming. The relative amount of evaporation which takes place in different parts of the Colony, is likely to prove the determining factor as to whether dry land farming is possible in all parts having the same rainfall. From experience already gained it seems quite likely that a 20-inch rainfall in some districts is no better than 15 inches in others where the evaporation is relatively lower.

FRUIT EXPORT.

Return of Fruit Exported from Cape Colony during January, 1910.

Port of Shipment.	Destination.	No. of Packages.	Description of Fruit.	Quantities.	Value.
					£ s. d.
Cape Town ...	England ...	11,662	Peaches ...	311,710	1,739 15 11
" ...	" ...	14,340	Plums ...	416,631	1,467 13 0
" ...	" ...	2,251	Apricots ...	71,045	280 2 10
" ...	" ...	1,831	Nectarines ...	55,319	266 18 0
" ...	" ...	7,861	Pears ...	305,713	963 0 3
" ...	" ...	62	Mangoes ...	1,860	4 0 0
" ...	" ...	1	Grenadillas ...	24	0 3 0
" ...	" ...	883	Grapes ...	10,604 lbs.	143 10 0
" ...	France ...	2	Apricots ...	270	0 15 0
" ...	" ...	134	Peaches ...	1,137	6 6 0
" ...	Lisbon ...	5	Plums ...	150	1 0 0
" ...	" ...	20	Peaches ...	900	5 0 0
" ...	" ...	10	Pears ...	300	2 0 0
" ...	Germany ...	35	Plums ...	1,050	3 10 0
" ...	" ...	20	Peaches ...	600	3 0 0
" ...	" ...	31	Pears ...	930	3 13 0
" ...	" ...	15	Nectarines ...	450	2 5 0
" ...	German South West Africa.	4	Watermelons	60	2 0 0
" ...	" ...	2	Sweetmelons	18	0 15 0
" ...	" ...	5	Apricots ...	1,840	2 10 0
" ...	" ...	4	Lemons ...	730	3 8 6
" ...	" ...	12	Bananas ...	7,950	8 11 6
" ...	" ...	56	Apples ...	14,920	27 18 6
" ...	" ...	21	Pears ...	3,944	7 0 0
" ...	" ...	116	Peaches ...	21,415	28 18 6
" ...	" ...	7	Oranges ...	2,180	7 7 6
" ...	" ...	12	Grapes ...	565 lbs.	3 18 6
" ...	" ...	23	Pineapples ...	960	8 14 2
" ...	" ...	353	Plums ...	27,205	56 6 6
" ...	Ascension ...	1	Pears ...	200	0 6 0
" ...	" ...	2	Grapes ...	55 lbs.	0 7 6
" ...	" ...	1	Nectarines ...	60	0 4 6
" ...	" ...	3	Plums ...	125	0 9 0
" ...	" ...	1	Peaches ...	60	0 3 6
" ...	St. Helena...	10	Grapes ...	150 lbs.	1 0 0
" ...	" ...	2	Pineapples ...	50	0 7 6
" ...	" ...	4	Peaches ...	120	0 7 0
" ...	" ...	9	Pears ...	225	0 13 6
" ...	" ...	4	Plums ...	600	0 14 0
" ...	" ...	4	Apples ...	200	0 10 0
" ...	Lobito Bay	1	Apples ...	100	0 7 6
" ...	" ...	1	Oranges ...	100	0 7 6
" ...	" ...	50	Plums ...	1,800	11 0 0
" ...	" ...	50	Peaches ...	1,800	11 0 0
" ...	Loando ...	116	Peaches ...	3,960	30 10 0
" ...	" ...	120	Plums ...	4,600	34 0 0
" ...	" ...	25	Grapes ...	200 lbs.	7 10 0
" ...	San Thomé	35	Plums ...	1,300	8 10 0
" ...	" ...	35	Peaches ...	1,300	8 10 0
Port Elizabeth	England ...	47	Pineapples ...	1,690	12 0 0

FLAX OR LINSEED

COMPILED FROM VARIOUS SOURCES BY W. J. LAMONT.

BIBLIOGRAPHY.—*Agricultural Gazette of New South Wales*, No. 4, Vol. 19; *Journal of Agriculture of Victoria*, No. 5, Vol. 4; *Agricultural Gazette of New South Wales*, Nos. 6, 7, Vol. 18; *Journal*, Department of Agriculture, Western Australia, No. 11, Vol. 12; *Flax Culture*, *United States of America Department Farmers' Bulletin*, No. 274.

Flax or Linseed (*Linum usitatissimum*) is a wiry, erect-stemmed annual growing to a height of from 3 to 4 feet and extensively cultivated in Ireland and Russia for a variety of purposes. Linseed oil is extracted from the seed, the compressed refuse of seeds is converted into oil cake for feeding to cattle, and from the crushed and ground seeds the powder known as Linseed meal is prepared. The oil is undoubtedly the most important product. The fibre for linen goods is prepared from the stalks.

Where it will grow.—The flax plant thrives in a warm, dry, loose soil, and where the land is stiff it should be well prepared prior to sowing so as to give the roots a free course in the early stages of growth.

Varieties.—Three grown in Victoria are "Riga," "White Flowering Belgium" and "Large Red" or "Calcutta" seed. The last is grown for oil-making purposes only, whilst the two former are required for both fibre and oil production.

Seeding.—The amount of seed required per acre depends on the purpose for which the crop is to be used. When grown for seed purposes only much less is needed than if for fibre. For seed the plant is encouraged to throw out lateral branches and the sowing will consequently be thin. That grown for both fibre and seed production is sown close. From 55 to 60 lbs per acre is necessary when growing flax for fibre purposes, while 30 to 40 lbs. would be ample for seed.

Sowing.—Drilling the seed is best for seed production, but for fibre flax must be sown broadcast. Great care should be exercised in getting an even distribution, and, as the nature of the seed makes this a difficult operation, it is advisable to mix it with earth or ashes before sowing. The seed should not be buried deeply—about an inch. The soil should be brought to a fine tilth, and a light bush harrow drawn over it.

Time of Sowing.—Seed should be sown at the same time as cereals, i.e. April and May, and reaped from November to January.

Weeds.—It is imperative that the land should be as free of weeds as possible, as these cause no end of trouble when the crop is used for fibre.

Stage of Ripeness for Harvesting.—A writer in the *Victoria Agricultural Journal* states: "That seed and fibre cannot be secured from the same crop has been proved over and over again. To obtain the best sample of seed the crop should be fully ripe and then will give—contrary to European precedent—an excellent fibre such as we have been putting

on the market, realising £45 per ton." The plant matures its seed somewhat unevenly. The top seed bolls ripen and open first, and when this stage is reached the crop should be harvested without delay and treated similarly to oats or wheat. It is advisable to set it in stooks as soon as possible to avoid loss in seed. It will be found that the unripe bolls fill up considerably when in the stook.

Mode of Harvesting.—Flax can be harvested with a mowing machine or with a reaper and binder. The after operations are the same as for other crops; the sheaves are stoked until dry, when they are stacked ready for threshing.

Threshing or Boll-crushing.—This operation used to be performed by hand, but this tedious and expensive method has been replaced by a machine consisting of rollers. The heads of the sheaves are passed through the rollers and the seed is easily winnowed and cleaned.

Retting.—This is perhaps the most difficult operation. It consists in rotting or destroying the gum which binds the fibres to the woody portion of the plant and it requires to be done in such a way as to avoid the decaying process to be carried so far as to affect the fibre. In European countries the straw is placed in water, sometimes running streams. In Ireland and other countries pits are used, and in Victoria this system has also been used, but is considered objectionable and unnecessary. A much simpler and less expensive method is that known as:—

Dew Retting.—To dewret flax the straw is spread out in straight rows, in the open air, about 1 inch thick. The more moisture there is in the atmosphere the sooner will the upper side of the straw turn from its original colour to a dirty grey. From two to four weeks will bring about this effect. When the upper side is deemed sufficiently exposed the lower is placed on top and left exposed to the weather for another two or four weeks. It is only by experience and observation that the happy medium between the two extremes of too tough and too rotten can be learnt.

If retting is insufficient, the fibre is difficult to separate from the stem, and if overdone the fibre is seriously injured and its value reduced almost to nil. The test is easily made, for as soon as the fibre separates freely from the inner or woody portion when broken it may be considered sufficiently far advanced to be removed, and when dried the decay is arrested. The material may then be stacked and treated as opportunity permits.

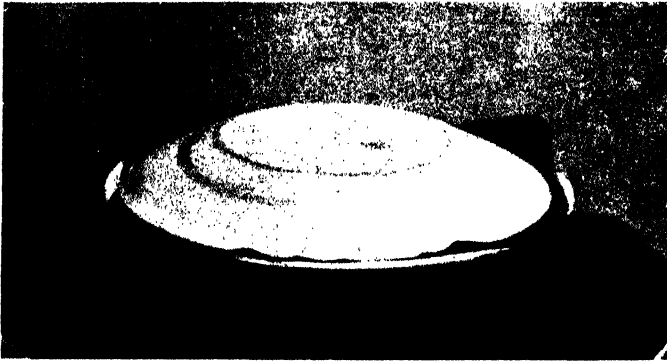
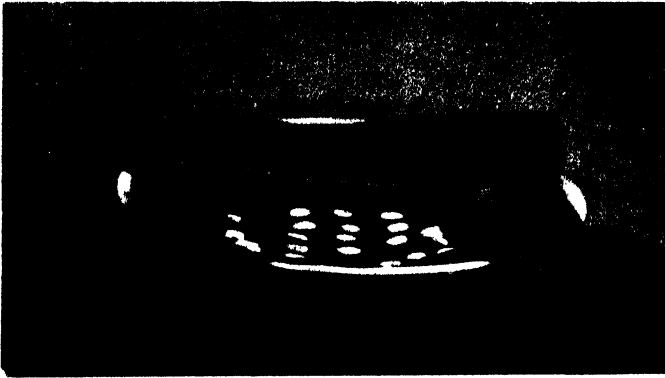
Breaking and Scutching.—This consists of crushing the retted straw between fluted rollers, and afterwards passing it through a beating or brushing process. The first operation breaks up the now fibrous portion of the plant into short bits from a half to one inch in length, which is readily separated in the scutching process. The scutcher consists of two upright sides, an axle running across from one to the other. This carries the small driving wheel and the 6 or 8, generally the latter, wide, bluntly-sharpened boards that revolve like the spokes of a wheel without a rim. These scutchers rotate very quickly and just miss in their revolutions the side of the machine, which is iron plated but with no sharp edge to cut the fibre. The broken straw is passed in so that the edge of the wide boards as they revolve tear away from the straw all the remaining portions and leave the fibre clean. The whole of the machinery is driven by a small oil engine, a 4-horse power being considered sufficient.

After passing through all the various stages the fibre is put up in bales similar to wool, weighing from 4 to 5 cwt. each. The tow, which consists of broken and out-of-place strands of fibre, is cleaned and served in a similar manner, and, as the value of this is only about one-third of ordinary fibre, skill in manipulation is shown by reducing this to a minimum.

SEED TESTING.

HOW THE FARMER IS AFFECTED BY THE PURITY AND GERMINATION OF HIS SEED.

It is surprising what little attention the farmer gives to the seed he sows compared with the preparation of the soil which receives it. All the fertilising in the world will not produce a good crop if the seed is not good, yet many farmers, year after year, sow bushels of seed without trying to find out if they are likely to get a 90 per cent. or 50 per cent. return.



Simple method of testing the germination of seed.
Top figure opened. Lower figure closed.

Even when dealing with a reliable seedsman one cannot take everything for granted. The seed may be as pure as possible, but, owing perhaps to a wet season, will not have ripened properly, and so the germination will be poor.

If, therefore, the germination is half what it should be, double the quantity of seed should be sown, otherwise the land will not produce the yield it is capable of giving, hence a proportion of the soil is practically lying idle during a whole season.

Some are tempted to buy cheap imported seed. Cheap seed is never cheap. It is usually full of impurities, which consist of stalks, broken seeds, chaff, particles of soil, all dead weight, and foreign seeds, mostly

weed, many of which may be noxious. These remarks apply to only imported seed. Colonial seed, owing to lack of proper seed-cleaning appliances, is often quoted at a low price on this account.

Supposing the seed gives a good germination but has a large percentage of impurities, the farmer is equally badly off as regards his return. Take, for example, a sample of lucerne having a 90 per cent. germination and only a purity of 80 per cent., for every 100 lbs. of seed purchased only 72 lbs. is pure seed. This figure is arrived at by multiplying the germination percentage by the purity percentage and dividing by 100.

TABLE OF TIME FOR TESTING AND PERCENTAGES OF GERMINATION AND PURITY FOR CHOICE MERCHANTABLE SEED.

Variety.	Length of time for Germination.	Percentage of Germination.	Percentage of Purity.
	Days.		
Alsike Clover	10	75—98	95
Barley	10	85—95	99
Buckwheat	10	90—95	99
Cabbage	10	70—95	99
*Carrot	14	80—85	85—95
Chicory	10	85	
Cotton	10	70	99
*Cocksfoot Grass	21	75—90	80—90
Cowpeas	10	85—90	99
Crimson Clover	10	85	96
Flax	10	85	98
*Foxtail Grass	21	70—85	80
Italian Rye Grass	14	96	75—95
Kaffir Corn	14	85—90	98
Lucerne	10	85—90	98
Lupins	10	83	98
Meadow Fescue	14	85—90	90
Mangold	10	97—99	90—95
*Mealies	10	85—95	96—99
Oats	10	85—95	96—99
Paspalum dilatatum	30	50	98
Perennial Rye Grass	10	96	75—95
Rape	10	90—95	99
Rye	10	90—95	99
Rescue Grass	21	50	95
Sainfoin	14	80 Rough 88—90 Milled	98
Serradella	14	85	94—97
Sulla	14	88—90	98
Sheeps Fescue Grass	28	75—80	80—85
Swedes	10	97—99	90—95
Timothy Grass	14	90—95	95—98
*Tobacco	10	75—80	98
Turnip	10	97—99	90—95
Vetches	10	90	98
White Clover	10	90—95	95—98
Wheat	10	85—95	99

* Temperature should be kept at about 70° F., for eighteen hours and 86° F. for six hours each day.

Lucerne, clovers, cereals and all quick-germinating plants can easily be tested at home by a very simple contrivance. Take 100 seeds, making no selection, but discarding foreign seeds, and place them between a fold of woollen material laid between two plates, as shown in the illustration. The

material used should be sterilised by being dipped in boiling water. Flannel is best, but if coloured, care should be taken to see that no dye comes out in the water as it may have an injurious effect on the seed. Keep the temperature at about 68° to 70° F., and be careful that the cloth is kept very damp but not soaked. Go over the seeds once daily, remove all that have sprouted, and keep a record of how many have sprouted each day. By the fourth day the majority will have germinated, provided the seed is good. Ten full days is the limit, the percentage being then taken.

Seeds that are of slow germination and those requiring a variable temperature, such as tobacco, beets, mealies, etc., are better sent to a Seed Laboratory where tests are conducted in a proper Germinator.

Under natural conditions it is best to allow about 5 per cent. *under* the germination percentage given by artificial conditions.

In testing grass seed, only glumes containing seed should be selected. The simplest way to detect the full from the empty is to wet the seed and spread it on a sheet of glass. When held up to the light, those containing grain appear opaque while the empty chaff is translucent.

If the seed purchased appears to have a large percentage of foreign seeds, samples should be sent to the Government Seed Laboratory for a purity test to be made.

Any farmer wishing to have a test made by the Government Seed Tester should send a sample of his seed in a clean linen bag packed in such a manner as to be thoroughly protected in transit from dampness or other injury, and which should be accompanied by a statement giving the following information:—

Name under which seed was sold.

Name of Seller.

Address of Seller.

Price paid.

When grown.

Where grown.

Name of sender.

Address of sender.

Date.

All samples sent should be a fair average of the larger bulk from which it is drawn, and should weigh approximately as follows:—

Cereals, peas, beans, vetches, beet "balls" and all larger seeds	10 oz. each.
Lucerne, clovers and all seeds of similar size, together with all the larger vegetable seeds except beet "balls"	4 oz. each.
Grasses, bromes, sorghums, millets and all the smaller vegetable seeds... ..	2 oz. each.

TARIFF OF CHARGES FOR ANALYSIS OF SAMPLES.

	s.	d.
Complete Analysis	5	0
(pure seed, other seed, rubbish, germination)		
Analysis for Purity	3	0
Germination	2	6

No application will be considered unless accompanied by the fees for analysis. Remittance should be made by Stamps or Postal Notes, or by P.O.O's, in favour of the Under-Secretary for Agriculture, Cape Town.

THE DESTRUCTION OF PRICKLY PEAR BY THE USE OF JANSEN'S EXTIRPATOR.

As a result of the demonstration held at Graaff-Reinet, the particulars of which were published in the *Agricultural Journal* for October, 1909, the Department acquired the secret of Mr. Jansen's preparation for the use of the farmers. It is as follows:—

1. Boil thoroughly for *30 minutes* half a pound ($\frac{1}{2}$ lb.) of good finely powdered lime and half pound ($\frac{1}{2}$ lb.) sulphur in one gallon of water. An extra quart of water should be added to above to allow for evaporation whilst boiling.

2. Dissolve half a pound ($\frac{1}{2}$ lb.) of salt and half a pound ($\frac{1}{2}$ lb.) of arsenite of soda in one gallon *boiling* water.

3. Mix the above Nos. 1 and 2 together, which will then equal two gallons fluid stuff.

4. To be applied as the tree stands, as follows: make an incision with a knife, with a sharp point, two to three inches deep into one or more leaves, according to size of tree, and inject the poison.

The above is the whole operation from start to finish, and it is only necessary to enlarge on point 4, *i.e.*, method of application.

The number of incisions necessary for a tree can soon be gained after a short experience with the Extirpator. For instance if a tree of medium size contain one stem with no branches one injection at the top of the tree will be sufficient to destroy the whole tree. Thus it only needs a little foresight to enable the work to be done with the least expense.

The method of injection is as follows:—The leaf, which is selected for the injection, is pierced with the sharp pointed knife at the top side of the apex and the knife is then moved backwards and forwards to enlarge the incision. The knife is given a half twist to open the incision made, and to keep it open a pebble is dropped into the opening. A little of the extirpator is then poured from a kettle into the opening, care being taken, however, to keep the fluid *well stirred* before pouring it out. The poison travels down the stem, inoculating the leaves as it passes. In doing large dense patches the outside fringe must first be treated, and as these die down the work is repeated on the next fringe, and so on till the centre is also treated.

This preparation is *not* meant to be sprayed, and can only be used as per instructions.

With reference to its properties should stock eat the treated leaves, nothing has really been proved, so that it would be advisable to keep stock away from the area under treatment until all likelihood of danger has passed.

A LESSON IN CLOSER SETTLEMENT.

By H. P. GORDON.

One of the most interesting and instructive examples of Closer Settlement and of the beneficial economic change it works in the character and diversification of the industries of a rural district, is furnished by the place from which I jot down these notes, viz., Colac, Victoria, Australia.

Twenty-five years ago this district, to quote from the Municipal Directory for 1884, was "taken up by stations." A "station" in Australian vernacular being a place where sheep and cattle are depastured exclusively, and the holdings in those days were few and large.

To-day the leading industries of this district, again quoting from the Municipal Directory for 1908-9, are "farming, dairying, onion and potato growing, bacon-curing, cheese-making, butter factories and creameries, and poultry-farming." The result of this change is seen in the immensely increased wealth-production of the Shire, the large increase in the rural population, and the augmented general prosperity of the inhabitants.

The Shire of Colac embraces an area of 1,094 square miles. Colac, the chief town of the Shire, is 95 miles from Melbourne, and connected by rail with that city. The average annual rainfall of the district is from 24 to 26 inches. In 1884 the population of the Shire was 5,500. In 1908 it was 11,750. In the former year the annual value of the ratable property in the Shire was £77,000. For the current year it is £237,896.

Twenty-five years ago first-class rural land was assessed at from £6 to £10 an acre. That same class of land to-day is rated at from £50 to £90 an acre. Within the last three weeks a sale by public auction took place here of 350 acres of what is locally known as "onion land." It was a sub-division by one of the wealthiest, and formerly one of the biggest, landowners of the district, and the prices averaged £66 11s. 6d. per acre--4 acres of especially good land, for onion growing, realised exactly £100 per acre. There was no farm-house or buildings of any kind upon any part of this sub-division.

In 1884 this district was given up to pastoral pursuits. The, relatively, few farmers within this Shire then confined themselves to cereal crops. Dairy farming, as then understood and practised, was carried on in a slipshod and go-as-you-please fashion. To-day dairy-farming, co-operated and systematised, is the chief and essential industry of the district. The books of the Shire Council show that for the current year there are over 1,500 farms of 100 acres and upwards each, and over 2,000 farms of from 10 acres to 100 acres each.

So far as the dairying industry is concerned, the following facts and figures I obtained from the manager of the Colac Dairy Company, Ltd. This company was established in 1893. It has two butter factories. Its nominal capital is £7,500, of which £6,435 have been paid up in money. The two factories are located within a distance of nine miles from each

other. Connected with, and under the management of the company are eight creameries, and one cream depôt, varying in distances from a few miles to 14 miles from one or other of the butter factories. In the year of its foundation the company paid to suppliers of milk £2,149 11s. 8d. It was not until 1896 that the company began to pay for cream, and in that year it paid away on this account £174 2s. 7d.

For 1908 the company paid out in cash to suppliers of milk £107,820 and £43,646 for cream. Besides which it granted bonuses to suppliers to the amount of £1,827 4s. 4d., and paid a dividend of £450. The company has paid £1,315,476 for milk and cream since its formation in 1893. The average price paid last year for milk was a fraction over fourpence per gallon. The company's total net profit for the year was £1,369 12s. 9d.

To dairy farmers of the Cape Colony the following table will probably be of interest. It is taken from the half-yearly report of the company, ending 30th June last:—

	1908.	1909.
Pounds of milk to one pound of butter	23.25 lbs.	24.56 lbs
Average price of butter fat per lb.	12.18d.	12.42d.
Average price per gallon milk	4.66d.	4.64d.
Cost of manufacture per lb. butter	.93d.	1.08d.
Freight and selling charges (Melbourne sales) ...	.62d.	.56d.
Freight and selling charges (export sales) ...	1.27d.	1.34d.
Overrun	12.16	15.79

The quantity of butter exported by the company for the season 1908-9 was 665,224 lbs., realising an average price of 108s. 10.70d. per cwt.

Co-operative dairy-farming and onion and potato growing have proved so profitable that the owners of the onetime large estates hereabouts have voluntarily subdivided their lands. In many instances, induced by the large sums per acre offered for their purchase, the sub-divided areas have been sold outright. In other instances they have been let to tenant farmers for various terms of years. The selling price for the freehold of onion and potato land, without improvements, averages £50 to £60 an acre. The rental value of onion and potato land is £3 per acre per year and occasionally £3 10s. The rental value of land for dairy farming is £2 per acre per year, and at these prices and rentals these respective branches of agricultural industry give handsome returns, particularly during the last five years.

For example, in this district the farmer looks for ten tons of onions per acre. The total cost of production, including marketing, is put down at twelve pounds per acre. Putting the market price of onions at £6, it leaves a profit of £48 per acre.

For potatoes, an average yield is from 8 to 10 tons per acre; cost of production, £10 per acre; average selling price, £4 per ton. Four years ago onions went up to an abnormal price, realising for a short period as much as £32 per ton. One landholder here, who gave me the figures himself, and showed me the land in question, let 40 acres that year "on the halves," subject to a rental of £2 10s. per acre, which was to be a first charge upon the profits. Over 400 tons of onions were obtained from the 40 acres. Some were sold at £10 per ton and the balance at £19 10s. a ton. The landowner's cheque for his half share was over £1,900. That, as I have stated, was an exceptional year.

In co-operative dairying also, the profits in this district are constant and certain and reasonably large. Last week the usual monthly pay day occurred for the payment to suppliers of milk and cream by the Colac

Company. Over £23,000 were paid for that month; one supplier alone receiving £343 for his month's supply. There are dairy tenant-farmers here who milk over 300 cows a day.

The farmers with large herds invariably use milking machines. The machine mostly in use in this district is the "Lawrence-Kennedy-Gillies" machine, an invention of three Victorians. Its capacity is from 16 to 72 cows an hour. Its price in Melbourne is from £46 to £187 10s. This machine is claimed to be by farmers here the "best in the world," and has been in use about six years. Its popularity is on the up-grade. But a New Zealander dairy farmer, a casual visitor here, tells me they have a better and cheaper machine in New Zealand, known there as "The Ridd" and "The Simplex."

As a direct result of the subdivision of the former large estates the face of the whole district has been completely transformed. Twenty-four years ago I spent two weeks in this neighbourhood. Then one might ride for miles without seeing a homestead, or an acre of cultivated land. Butter factories were only just beginning to be talked about. One then heard of nothing but sheep and wool. To-day the current local topic of conversation is onions, potatoes, and dairying. The farmers have recovered from the scare of over-production. When butter factories were first talked of the so-called dairy farmer of that day threw up his hands in dismay at the prospect. He anticipated that butter would become so cheap that his occupation would soon be gone. Not only has the dairy farmer abandoned this superstition, but the grower of onions, potatoes and cereal crops, etc., has been made to realise, by the test of actual experience that in any commodities capable of export he need have no serious fear of over-production.

And the big landowners, where are they? Many of them are still here. But those of them fortunate enough to possess land suitable for onions, potatoes, or dairying have found it enormously more profitable to sub-divide their lands and either sell, or rent, the sub-divided areas. They also do a good deal of farming, and dairying themselves. And the great industry of wool-growing is driven back farther inland, to be pursued there upon broad acres, which at present cannot well be more profitably used for anything else.

Two facts are worthy of note. The dairy-farmer artificially feeds his cows at certain seasons, and the use of a "home separator" is coming largely into vogue. By separating on the farm, the farmer economises in time, in the number of trips to the creamery, and he has his skim-milk available at once for his pigs and calves.

ANIMAL DISEASES—CONTAGIOUS AND INFECTIOUS.
Summary of Outbreaks of Contagious and Infectious Animal Diseases Scheduled
under Act No. 27 of 1893.
Still under Quarantine on 31st January, 1910.

DISTRICT.					Anthrax.	Epizootic Lymphangitis.	Glanders.	Lungsickness.	Redwater.	Scabies (Equines.)	Sponsziekte.	Totals.
Albert	...	...	...	...	...	...	1	...	...	...	...	1
Barkly West	...	...	...	...	2	...	...	1	...	...	...	3
Calvinia	...	...	...	...	...	...	1	...	...	...	...	1
East London	...	...	...	...	3	...	...	6	...	...	4	13
Hay	...	...	...	...	3	...	...	...	...	...	...	3
Herschel	...	...	...	...	1	...	...	...	...	...	1	2
Hope Town	...	...	...	...	...	...	...	1	...	...	...	1
Humansdorp	...	...	...	...	...	1	...	...	...	3	...	4
King William's Town	...	...	...	...	2	...	...	5	...	...	...	7
Middledrift	...	...	...	...	...	...	...	...	...	...	1	1
Komgha	...	...	...	...	5	...	...	9	...	...	...	14
Kuruman	...	...	...	...	3	...	...	...	...	...	...	3
Ladismith	...	...	...	...	...	...	1	...	...	...	...	1
Mafeking	...	...	...	...	1	...	...	...	...	...	...	1
Stockenstrom	...	...	...	...	...	...	...	...	1	...	...	1
<i>Tembuland.</i>												
Umtata	...	...	...	...	...	...	...	6	...	...	...	6
Engcobo	...	...	...	...	...	...	...	17	...	...	...	17
Xalanga	...	...	...	...	...	...	...	1	...	...	...	1
St. Mark's	...	...	...	...	...	...	...	3	2	...	...	5
Mqanduli	...	...	...	...	...	...	...	3	...	...	3	6
Elliotdale	...	...	...	...	...	...	...	6	...	...	...	6
<i>Transkei.</i>												
Butterworth	...	...	...	...	...	...	...	1	...	...	...	1
Kentani	...	...	...	...	1	...	...	1	...	...	2	4
Nqamakwe	...	...	...	...	1	...	...	8	...	2	1	12
Tsomo	...	...	...	...	...	...	...	4	3	...	...	7
Idutywa	...	...	...	...	...	...	...	11	...	...	...	11
Willowvale	...	...	...	...	...	...	...	9	...	...	19	28
Port St. John's	...	...	...	...	...	...	...	1	...	...	...	1
<i>Pondoland.</i>												
Libode	...	...	...	...	...	...	...	2	...	...	1	3
Ngqeleni	...	...	...	...	...	...	...	4	...	...	1	5
Lusikisiki	...	...	...	...	...	...	...	3	...	...	...	3
Flagstaff	...	...	...	...	...	...	...	4	...	...	...	4
Tabankulu	...	...	...	...	...	...	...	8	...	...	...	8
<i>East Griqualand.</i>												
Mount Ayliff	...	...	...	...	...	...	...	1	...	...	1	2
Umzimkulu	...	...	...	...	...	...	...	...	1	...	4	5
Qumbu	...	...	...	...	...	...	...	2	...	...	...	2
Tsolo	...	...	...	...	...	...	...	8	...	...	...	8
Mount Frere	...	...	...	...	...	...	...	1	...	...	...	1
Mount Fletcher	...	...	...	...	...	...	...	...	...	...	1	1
Totals	...	...	...	...	22	1	3	126	7	5	39	203

J. D. BORTHWICK, Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 2nd March, 1910.

EAST COAST FEVER.

STATEMENT OF MEASURES TAKEN TO SAFEGUARD THE COLONY OF THE CAPE OF GOOD HOPE AGAINST THE INTRODUCTION OF EAST COAST FEVER FROM THE ADJOINING COLONIES OF NATAL AND TRANSVAAL.

The following is a resumé of the steps which have been taken by the Government for safeguarding this Colony against the introduction of East Coast Fever from the adjoining Colonies of Natal and Transvaal.

Guarding of Borders.—*Cape-Bechuanaland Protectorate Border (about 300 miles).*—Guarded and patrolled between Ramathlabama and Kuis by 19 C.M.P. and 3 Native Detectives. Camps established at Ramathlabama, Pitsani, Tsedilomolomo, Packenham, Detlaraping and Morokwen.

Cape-Transvaal Border (about 262 miles).—Guarded and patrolled by 34 C.M.P. and 1 Detective. Camps are established at Christiana Gate, Thornhill, Kopje Enkel, Home Rule, Pudimoe, Malalaring, Mosymiyani, Broeders Puts, Welverdiend, Rosaquali, Kraaipan, Maritzani Eye, Rietfontein, Rooigrond, Malmani Road and Ramathlabama.

Cape-Natal Border (about 330 miles).—Guarded and patrolled by 109 C.M.R. and 220 Natives. Three special Native Detectives are also employed in each of the Districts of Umzimkulu and Bizana. Camps are established at Bonnyvale, Stanford's Drift, Brighton, Middleton, Riverside, Railway Camp, Arnold's Drift, Waterfall, Umfulamuhla, Union Bridge, Stranger's Rest, Middleford, Gloucester, Iron Latch, Gugweni Gate, Harding Gate, Staffords Gate, Ingeli Gate, Amanzimyama, Boshof's Drift, Owen's Camp, Mjika Camp, Webster's Drift, Davies' Camp, Impindweni, Lugie, Middledrift, Gunther's Camp, Clark's Camp, Leecon Camp and Umtamvuna Mouth.

An inspection of the Cape Colony-Protectorate Border near Kuis (the most westerly point guarded by this Government), made by the local sub-inspector of the C.M.P., indicated the advisability of stationing men in the vicinity of Kuis and Madebing, and mounting them on camels, as, owing to the long distances to be traversed and the scarcity of water, supervision on horseback was out of the question. Three camels have been purchased for this purpose. Fencing of this border is not considered necessary at the present time.

Border Fences.—The frequency with which repairs of the Transvaal Border fence were needed suggested a thorough inspection of this fence. As a result it was found necessary to overhaul the whole line of fence, which consists in part of four and five wires only. The strengthening of the fence is now completed, the fence consisting of five wires and upwards throughout, except where the standards, being driven into hard, rocky ground, could not be raised so as to carry an additional wire to bring the fence up to the desired height of 4 feet 6 inches. No advantage would have been gained by making these particular sections of the fence a six strand one, as it would have necessitated at least two of the

wires being placed within an inch or two of each other, and even then would not have reached the desired height or in any way added to the efficacy of this section for keeping cattle out.

In those sections of the fence carrying seven wires, the extra strand has been inserted by the owner of the farm which the fence traversed in order to render it proof against small stock.

All additional and renewed wires are barbed and all unsound poles have been replaced with iron standards.

On the Natal Border the fence erected for Rinderpest purposes having been in existence from the Drakensberg to Boshoff's Drift and since repaired, it was only necessary, in order to complete the fencing of the whole of the border, to erect the section from Boshoff's Drift to the sea. This was completed at the end of September, 1908. In the beginning of 1908 considerable pressure was brought to bear in favour of a clear zone along the entire border, and a belt of 800 yards was established, from which all cattle were excluded except cattle to be milked or yoked and those used for the cultivation or removal of produce and transport of goods from the Ports of Entry in that section of the zone extending from the Basutoland border to Ingeli. This was, however, found to be impracticable and also likely to alienate the border farmers in so far as the section from the Drakensberg to the confluence of the Umzimkulu and Ibisi Rivers (about one-half of the border) was concerned; and to that extent the belt was accordingly withdrawn. The same reasons applied also to the portion of the border north of Alfred County; but as this section had not the advantage of a river frontage, it was deemed advisable to erect a double fence about 50 yards from the then existing fence along this extent (about 50 miles), and upon completion of the fence, in August, the 800 yards belt along this section also was withdrawn. Meanwhile, an inspection of portions of the fence along the Umzimkulu River indicated that the fence from the Drakensberg to the junction of the Umzimkulu and Ibisi Rivers (170 miles) needed overhauling, in some parts silt and rubbish having washed up against the fence to a height of 2 feet, thus lowering it to only 2½ feet. Immediate steps were, therefore, taken to effect these repairs, at a cost of about £2,700, the fence being at the same time heightened to 5 feet 6 inches in those parts where the configuration of the ground rendered a height of 4 feet 6 inches inadequate.

Restrictions.—The following are those at present in force:—

- (a) From Natal no cattle, animal produce, grass, hay, reeds, rushes, herbs, plants (other than cultivated ones) or other vegetable matter can be introduced. Through Stanford's Drift and Union Bridge only vehicles and goods not prohibited which have been hauled all the way to the Border by equines from Donnybrook or Ixopo, as the case may be, are admitted. Through Riverside all live-stock other than cattle, sheep and goats, and all articles and things whereof the introduction is not specially prohibited and which are not conveyed in cattle trucks are admitted by rail only. This Port is also open for equine transport used solely for the conveyance of passengers and their personal effects. Ingeli and Harding Gates are open only for human beings and their personal effects and mail bags. Mail bags can only be brought through Middledrift, under the supervision of the Border Guard.
- (b) From the Transvaal the introduction of cattle, grass, hay, reeds, rushes, cattle manure, and green hides, skins and horns is prohibited. Vehicles drawn by equines can cross the border at any gate, but those drawn to the border by cattle can only enter at Rooigrond and Mosymiyani after being outspanned on the

Transvaal side, whence they are drawn across the border by mules. *Dry* hides, skins and horns have to be properly cured and dressed, and to be accompanied by a certificate by the Principal Veterinary Surgeon of the Transvaal to this effect. Wool and mohair must be properly baled and come direct to a railway station between Mafeking and Fourteen Streams for consignment to a port without being opened *en route*.

- (c) From the Bechuanaland Protectorate the introduction of all cattle other than slaughter stock is prohibited, and slaughter stock have to be dipped under supervision at Ramathlabama before they enter.
- (d) From Rhodesia the introduction of cattle, grass, hay, reeds, rushes, and *green* hides, skins and horns is prohibited. *Dry* hides, skins and horns can enter only under the same conditions as in the case of the Transvaal.
- (e) From the coast north of Durban the introduction of cattle, sheep, goats, buffaloes and antelopes is prohibited.

The grazing or depasturing of any horned cattle on the land lying between the Ingwangwane, Indowana, Umzimkulu and Umtamvuna Rivers and the Border Fences is prohibited under penalty of immediate destruction without compensation, while the removal from the same area of grass, hay, rushes, reeds, herbs, plants and other vegetable matter liable to carry ticks is also prohibited.

The importation into or removal from place to place within the Transkeian Territories, with intent to spread East Coast Fever, of any animal or portion of the carcase of any animal or any articles or things which, either by contact with any affected animal or through any other means, are liable or capable or have been rendered capable of transmitting the disease is prohibited under a penalty of £500 or seven years' imprisonment, or both such fine and imprisonment.

An Advisory Board, composed of Europeans and Natives, to assist the local Magistrate, has been formed at Umzimkulu. This Board has been of considerable assistance to the Department, and has been the means of establishing a system of co-operation between the Government and the local people.

Eleven men have been specially appointed for the purpose of repairing any breaks which may occur in the fence along the Natal Border. These men move constantly up and down the fence, each taking a defined section, and at the same time do the duty of guards, while 84 additional Natives have been specially engaged to guard the drifts across the Umzimkulu and Umtavuna Rivers to prevent cattle being smuggled across at night. Twelve extra guards have also been engaged on the land boundary between the Ingeli and the junction of the Ibisi and Umzimkulu Rivers.

Depots have also been established at Riverside, Umzimkulu, Bizana and Port St. John's, where an emergency stock of fencing materials has been stored to enable the Government to cope without delay with any outbreak, in the event of the disease crossing the Border.

Two Veterinary Surgeons have been specially stationed at Umzimkulu and Bizana for examining outbreaks of disease on the border both in this Colony and in Natal territory, for the purpose of identifying the nature of the disease.

Special Legislation (Act No. 17 of 1908 and Proclamation No. 131* of 1909) has been passed giving full powers for dealing with any outbreak of East Coast Fever, and the Department is, therefore, in the position to take prompt measures should it unfortunately be necessary to do so.

The Government has determined to adopt a policy of clearing the districts which border on Natal as far as possible of ticks, and with this object in view, is adopting the following measures, viz. :—

1. Dividing fences between the Lower Locations in the Umzimkulu District and the adjoining properties are being erected under the Fencing Acts as rapidly as possible.
2. A new fence has been erected from Brooks Nek through Pondo-land to the coast, in the event of the necessity hereafter arising for providing a further line of defence. Arrangements are also being made for putting No. 3 fence from Ingeli to Umzimvubu River in a state of thorough repair.
3. Nine additional cattle dipping tanks are being constructed in the Bizana District; eight additional in Umzimkulu; three additional in Mount Ayliff, and one in Matatiele—all to serve the purpose of dipping cattle owned by Natives, and periodical dipping will be made compulsory in those Districts as soon as the tanks are completed.
4. Stock Inspectors have been appointed by the Government for the following Districts, viz. :—

Umzimkulu (2).

Bizana (2)

Mount Currie and Mount Ayliff (1).

5. Supervision of dipping will be provided and dip supplied (a) at cost of owners in European areas; (b) at the cost of the Council in District Council areas, and (c) out of the proceeds of a special tax of 2s. 6d. which will be re-imposed in non-Council Native areas.
6. The offer of monetary grants on the £ for £ principle in aid of the construction of cattle dipping tanks has been withdrawn, and is being superseded by a system of advancing loans from public funds subject to repayment with interest in annual instalments.

As a further precautionary measure, the Districts of Bizana and Umzimkulu have already been proclaimed "suspected" districts, from or into or within which the removal of any horned cattle is regulated by Proclamations Nos. 461 and 462 of 1909 respectively. Transport wagons and goods from adjoining districts of this Colony are only admitted into the Bizana District through Nqabeni Drift, where they are hauled across by a steel cable after the oxen drawing them have been outspanned on the Flagstaff side of the boundary. Sixty Native Guards under the charge of three C.M.R. have been engaged to guard all drifts where cattle may cross or be illicitly introduced, and to patrol the boundary, whilst the Headmen of the Border Locations are also being granted a small monthly allowance in consideration of their rendering similar assistance. Any cattle which may be introduced into the Bizana and Umzimkulu Districts from adjoining districts, in contravention of the Regulations will be impounded by the Headman of the Location in which they are found and isolated as completely as circumstances permit pending an enquiry by the Resident Magistrate and instructions as to their disposal. It may be added that only human beings on foot with their personal effects are permitted to cross the border from Bizana into Natal, and then only through Middledrift.

Owners of farms in the Umzimkulu District who own farms contiguous thereto but situate in an adjoining district, e.g. Mount Currie, are, however, permitted to move their cattle to such contiguous farms (*but not to*

farms owned by them contiguous to the latter), and *vice versa*, provided such cattle are not removed beyond the boundary of their farms in the adjoining District.

CATTLE DIPPING.

The Cattle Cleansing Act, No. 31 of 1908, as amended by Act No. 43 of 1909, enacts legislation for preventing the spread of ticks by the removal of cattle. The main provisions of the Act are that tick-infested cattle may not be on any main, divisional or municipal road, nor on any public outspan or commonage, unless they have been cleansed within 14 days, or are proceeding direct to a dipping tank not more than 10 miles from the place of removal, and they must be under the control of a competent person. This does not, however, apply to cattle of persons within the boundaries of their properties. Cattle on such a road or place may be inspected by a Field Cornet, Justice of the Peace, Sheep Inspector or Police Officer, any of whom may demand to see the certificate, or permit required by the Acts. These Officers are also enjoined, if the certificate or permit be not forthcoming, to cause the cattle to be cleansed at the cost of the owner.

By Proclamation No. 11 of 1910, the term "cleansed" is defined and the form of certificate required prescribed.

The Act has been proclaimed in force in the Divisions of East London, Bathurst, King William's Town, Komgha, Albany, Port Elizabeth, Fort Beaufort, Alexandria, Cathcart, Victoria East, Stutterheim and Peddie. It leaves Divisional Councils to decide whether it shall be enforced in their divisions or not.

Fair progress has been made in regard to the construction of cattle dipping tanks, which are distributed as follows:—

LIST OF PUBLIC AND PRIVATE DIPPING TANKS.

<i>District.</i>	<i>Public Tanks.</i>	<i>Private Tanks.</i>
Albany	Grahamstown	Mount View, Manly Flats, Jericho, Thorneycroft, Glen Boyd, Ballinafad, Southey's Hoek, Ashtondale, Ward Vale, Clay Pits, Frazer's Camp, Bucklands, Crosslands, Hebron, Sweet Kloof, Pleasant Prospect, Mount Pleasant, Woodlands, Middleton, Ellende, Schmit Kop, Woodberry, Retreat.
Alexandria	Alexandria Commonage, Paterson Commonage, Graaff Water, Doornkloof.	Hopefield, Leeuwenbosch, Bushy Park, Hilary, Bluegum Villa, Sea View, De Grip, Thornhill.
Adelaide	...	Saxfold Park, Elandshoek.
Bathurst	Round Hill Outspan, Brak River Outspan, Bathurst.	Greenfountain, Thornhill, Tharfield, Cuylerville, Rokeby Park, Summerhill Park, Kasonga West, Coombs.
Bedford	Klipplaat	Bellevue, Cullendale.
Butterworth	Butterworth Commonage.	...
Cathcart	Cathcart	Thomas River, Waku Valley, Middledrift, Ferndale, Rookin, Hopewell, Wellington, Cloete Dale.
East London	East Bank Location	Dreyer's Hoek, Prospect, Hillside, Elliotdale, Shelford, Ferndale, Amalinda, Farms 10 and 89 in Ward 5, Farms 154 and 113 in Ward 6, Gonubie Park, Lilyfontein.
Engcobo	Engcobo Commonage	Nil.

<i>District.</i>	<i>Public Tanks.</i>	<i>Private Tanks.</i>
Fort Beaufort ...	Fort Beaufort, Yellow-woods Outspan.	Baddaford, Olive Cliff, Septor Manor, Rocklands, Rietfontein, Clifton, Botha's Post.
George ...	George Town, Diepkloof, Woodville.	Nil.
King William's Town	King William's Town, Berlin Commonage, Keiskama Hoek, Welcomewood.	Gray's Drift, Gobongo Park, Gonubie, Mowbray Park, Sparkington, Izeli.
Knysna ...	Knysna, Eastbrook	Nil.
Komgha ...	Komgha Commonage	Lincoln, Kei Bridge, Stainland, Annexation, Mooi Plaats, Farm 267, Kwelera; Farm 292, Farm 287, Waterfall, Keikop, Ewanrigg, Lower Kuku, Lot 46, Westbury, Thorn Park, Denston.
Mount Currie ...	Herman ...	Fairview, Glen Dower.
Mqanduli ...	Mbozisa ...	Nil.
Nqamakwe ...	Blythswood ...	Nil.
Port Elizabeth ...	Port Elizabeth (in course of construction).	Bushy Park, Little Chelsea.
Peddie ...	—	Pera, Gola Poort, Dunstan, Wool-dridge.
Stutterheim ...	Bolo Police Reserve	Cloverdale, Quetta, Wetherrun, Waterford Estate, Woodridge.
Uitenhage ...	Glen Connor	Cuyler Manor, Perseverance, Prentice Kraal, Maitland River, Coega's Kop, Tankatara, Aloes.
Umtata ...	Umtata ...	Nil.
Umzimkulu ...	Umzimkulu, Lourdes, Riverside.	Sneezewood.
Victoria East ...	Alice, Calderwood	Alandale, Witney, Nottingham.

In addition to the foregoing, cattle dipping tanks, which are available for use by the public, have been constructed by the District Councils in the following Districts of the Transkeian Territories, viz.:—Elliotdale (1), Engcobo (2), Idutywa (1), Kentani (3), Mqanduli (2), Qumbu (1), Tsolo (1), Umtata (3), Umzimkulu (2), Willowvale (1), and Mount Ayliff (2).

In Pondoland 16 tanks have been completed, distributed as follows: Bizana, Libode and Ngqeleni, 3 each; Flagstaff, Lusikisiki and Tabankulu, 2 each; and Port St. John's, 1.

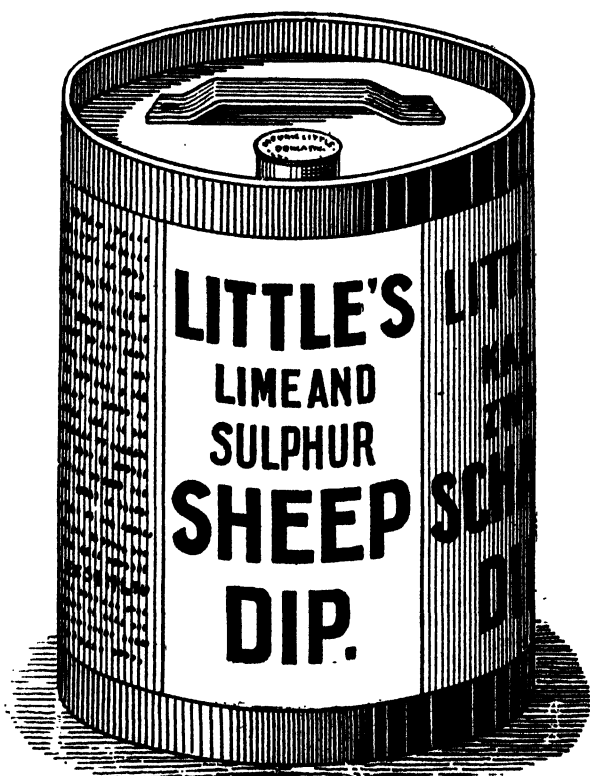
MILK RECORD.

ELSENBURG COLLEGE HERD.

Subjoined is the Milk Record to the 28th February, 1910 :—

Breed and Cow.	Days in Milk.	YIELD IN LBS.		
		During February.	Total to date.	Daily Average.
FRIESLANDS.				
Cleopatra	288	59	9,476	32·9
Vera	250	351	6,135	24·5
Violet	231	229	6,229	26·9
Bell	219	508	7,630	34·8
Belladonna	182	353	3,780	20·8
Rose	115	624	4,040	35·1
Daisy	34	1,118	1,391	40·9
Beauty	34	886	1,073	31·6
JERSEYS.				
Gertie	294	127	6,018	20·5
Gwendolen	250	225	5,105	20·4
Grace	250	197	4,320	17·3
Gladys	243	226	5,065	20·8
Gus	200	335	4,080	20·4
Fanny	188	329	3,402	18·1
Gilliflower	181	282	4,141	22·9
Glee	134	401	2,703	20·2
AYRSHIRES.				
Queen Dot	239	270	4,936	20·7
Lobelie	228	270	5,271	23·1
SHORTHORN.				
Maggie	229	385	6,136	26·8
CROSS.				
Bessie	250	194	8,896	35·6

SCAB



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MANUFACTURED BY

MORRIS LITTLE & SON (F & C) Ltd.

PORT ELIZABETH.

CORRESPONDENCE.

South African Dairy Industry.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—After much serious consideration of the above, I have sent the attached circular letter to the various interests concerned, and may I hope you will find the subject of sufficient importance to help in bringing about, through the medium of your valuable Journal, a wider knowledge of the circumstances attending same than exists to-day? I venture to assert that within a few years the dairy industry in South Africa will, in importance, rank equally with the best farming interests, such as wool, feathers, etc., if the movement be fostered as it has been in other countries. For this, organisation is the first essential, and hoping for your assistance and co-operation. —Yours, etc.,

R. J. MOORE,

Creamery Expert.

East London, February 10.

Carlton Hotel, Johannesburg, 8th February, 1910.

Dear Sirs.—During the past four months having studied the conditions of dairying in South Africa generally, arising from the development of the industry over the comparatively short space of the past two years, and in the light of past experience—extending through many years spent in the dairying countries of Europe—I have come to the conclusion that the immediate organisation of the industry on principles known to be successful in other countries in their application to the Science of Dairying is imperative on our part. I mean in this respect, that such principles should be stamped to meet the necessities of our South African conditions, and which I may claim to have some knowledge of—gained within the past five years in my attempt to establish the largest system of Creameries so far thought of in the Cape Colony.

The basis of dairying, to be successful, must rest on, according to my experience :—

- (a) *Technical Education* in the Science of Dairying.
- (b) *Organisation* for production and distribution.

These headings contain the essentials of success, and it is for us engaged in the industry to judge how far our position in respect of both may be said to meet our conditions, and with a view to formulating a programme on a broad or national basis which may meet with the sympathy of creamery owners, managers and the future United Government of South Africa.

I suggest, after consultation with various creamery-workers and interests, that a Conference be held at an early date and at a convenient centre (may I suggest Bloemfontein?), which may deal with the situation as it is to-day. I briefly touch on the latter point, with a view to suggesting the subjects for such a Conference as I propose.

Creameries are springing up all over the country, nominally without control or guidance from any common centre; as institutions, competition between them is commencing both in respect of production and distribution—the latter particularly in a ruinous fashion.

There seems to be no *standardised system* in respect of building and equipment, which is a great disadvantage and source of loss, as another year or two will show.

The Management within the creameries may be sound or otherwise, and, to my mind, is a matter of mere chance since the country affords managers little opportunity

of education—here just think of the huge sums spent by our competitors, such as Canada, Australia, Ireland, Denmark, etc., on the Science of Dairying. Managers, as such, are without any organisation which should mainly exist for their education as a body, while protecting their interests as a whole. When all is said and done, the great future of the industry depends on the managers of our creameries in the main.

Markets: To-day the conditions are nearly chaotic—and in another year, with developments now pending, local or home summer supplies will have reached such proportions that, unless a central system of control is established, prices ruling will mean the destruction of our work almost before its birth. It lies with ourselves to avert any such calamity.

Education of suppliers, in respect of production, the proper care and treatment of milk and cream, and, equally essential, the development and treatment of dairy cattle. To-day we have in South Africa numbers of cows, sufficient to yield millions of pounds worth of dairy produce annually. Why is this not the case? I think essentially the want of education and management.

Without giving further reasons, the necessity will be clear for the conference I propose, and in the absence of any organisation, I willingly offer my services as Secretary *pro tem*, to carry out any action this letter may promote.

The importance of the industry, as I feel it, is my excuse for sending a copy of this letter to every creamery in South Africa, as well as to Ministers of our respective Governments, Presidents of Agricultural Societies, etc.

I await your reply, and any suggestions you may be good enough to make, with interest, when I shall let you know what further action is being taken in the matter.

Very faithfully yours,

R. J. MOORE.

Creamery Expert.

Kindly address reply to:—

R. J. MOORE.

Creamery Expert.

Eastern District Creameries.

East London, C.C.

The Destruction of Moles and Beetles.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Will you kindly allow me a small space in your valuable *Journal* to reply to Mr. C. J. Visagie's letter appearing in the *Agricultural Journal* of December re moles in the garden. I think I can put Mr. V. in the way of diminishing them if he would like to go to a little trouble. There are three ways of destroying them. First, as soon as I see any fresh mole hills in my vegetable garden I get a mole trap and open the mole hole to allow half of the trap to fit into it. I then get a piece of plank or American aloe leaf, about 6 or 7 inches long; this I place up against the handle of the trap and on the part that is projecting out of the hole and cover it up with ground, leaving a little air-hole at the one end of the leaf. When the mole comes to close the hole he gets caught. The trap must be set very lightly, and the tongue of the trap must be put nearer to the jaws that are outside of the hole; if it is not the mole will set the trap off with the ground that he pushes in front of him before the body is properly into the trap. I always look out for a side hole, and if there is I break it open about a foot from the other and set another trap. The tongue of the trap must be slightly tilted. This is done by putting the foot of the tongue firmly on the one side of the trap, and on the other side it must just catch to keep the trap open, so that a slight touch will set it off.

The Mouse Trap.—I catch many moles with a trap which is a little larger than an ordinary mouse trap. As soon as I see a fresh mole hill I break the hole open and cut along with it for about four or five inches so that the trap fits into it, only the spring sticking out. I place a stick about an inch thick on the spring of the trap standing straight up, and put a piece of aloe leaf up against it and cover the hole up entirely with ground, and when the trap is set off it will shoot the stick out. This shows me when the trap is set off, and saves me the trouble of moving the ground away to see

if it is off. The hole must be cut large enough so that the trap does not catch the ground above it instead of the mole. Care should be taken that there are no side holes. I always choose a straight one, and set the trap lightly and on a level with the bottom part of the hole.

Fuse.—The easiest way to kill moles or drive them away is to open a fresh mole hill and to run a good piece of fuse into the hole. It will not go very far as the holes are very winding, but about two feet is far enough, although the more fuse that goes into the hole the better, and the more smoke. When it has got up to the length mentioned, it can be cut off at the mouth of the hole and set alight, and as soon as it has burnt into the hole an inch or two, cover it up lightly. If any more fresh mole hills are near about more fuse can be used. I have often tried to poison them by putting strychnine and Cooper's powder into tulip bulbs and potatoes, but it is no use, they only shoot them out of the hole again. They prefer potatoes that have no poison in. They are something like the jackall, who likes fresh meat best. Mr. Visagie or any of your other readers must not think that moles (especially as they are here on Zuurberg) can be exterminated in a few days. It will take time. But some people do not care to be put to any trouble. They like to take things easy and let things take their chance, if they come to anything or not.

There is another pest, which is worse than moles, that has visited us this season more than any other season. It is a black beetle with yellow stripes over the body. It is called by the Dutch a *Torrar* or *Torrer*. In the month of November they attacked my potatoes, beans and tomatoes, doing a lot of damage. I at once made a strong solution with Cooper's powder and put it into a little galvanised iron bucket with a wide top and 7 inches high. I put about 3 inches of the liquid into the bucket, and holding it sideways up against the potato tops where the beetles were in hundreds, and I started knocking them off into the bucket with my four fingers: just a slight brush up against the plant and they fall off and appear to be dead. Those that miss the bucket and fall on the ground I pick up with my hand and chuck with the others. As soon as the liquid is covered with them and they begin crawling over one another's backs, I give them a good stirring, and if the liquid is strong enough they will be dead in a minute or two. When they are dead I bury them where the ducks and fowls can't get to them. As soon as I have done that I keep on as before. As the sun gets hot they get wild and fly about. The best time to work with them is early in the morning and in the evening, or on cold days. If I had not kept on with them as I did I would not have had any potatoes, beans or tomatoes, and I am thankful to say that I have saved them all, and I will get good crops. There are very few *Torrars* left now, and by so many swarms being killed this season there will not be so much larva deposited into the ground, so perhaps we may not have so many of the pests next season. I think the above plan is a very good one, although it may take a little time. It does not only kill the *Torrars* but many other little pests that do a lot of harm to the plants, such as the grubs, caterpillars, lady birds, green grasshoppers, flat green beetles, and many others.

Another very destructive pest is a long green worm with yellow stripes over the body and a little horn where its tail should be. It is about 3 to 4 inches long. This pest cleans all the flowers and leaves from the potatoes, simply leaving the bare stalk. I have never seen so many in my life as I have seen this season. I put many hundreds of them into the same bucket as the *Torrars*. There are two kinds of them—the one is a brown colour with a white head, and the body looks as if it had been sprinkled with quicksilver. It is a very pretty worm. In December and January they all crept into the ground, and then they turn into a cocoon, and later on come into a large moth with spots on the wings.—Yours, etc.,

T. S. LEPPAN.

Ann's Villa, 9th February, 1910.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the November number of the *Journal* some one wants to know how to get rid of moles. The best way of destroying moles is the following:—Open with a spade the mole run at a mound, so that you have both holes or runs in view, then sit ready with a shot-gun loaded with No. 7 or 8 shot. After a little while you will see master mole working out ground to close up the opening. Then is your time. Fire as soon as you see the ground move, and you will have your mole, and as there are several moles in one run, you will have to watch the hole till another one comes to close same up. When that run is cleared, repeat the process with all runs, and you will exterminate every man jack of a mole.—Yours, etc.,

S. P. LOUW

Hopetown, January 31.

The Mystery of the Mud Turtle.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In regard to the question, "Where do turtles go to in a dry season?" it may be interesting to your readers to hear that some forty years ago, when I was a young man, I used to fetch our post on horseback 18 miles from home, and in passing one of our dams, then dry, I noticed under a large mimosa tree a turtle half buried in the sandy ground. It was about 50 yards from the dam, and 20 yards from the road. For about six months I passed this spot about once a week, and took care to look for the turtle. The rainy season then came on, the dam got full, and my friend disappeared. As turtles are said to live a very long time, this one may possibly still be there and visit his leafy residence when the watery one is dry.—Yours, etc.,

A. S. JACKSON.

Loxton, February 9.

A Strange Occurrence.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Enclosed please find a letter I wrote to the *Graaff-Reinet Advertiser*. I would like to know if anybody has ever had or heard of a similar case. People in town won't believe that the breath must have affected the boy, and say it must have been epileptic fits the boy had.

He and his wife both say he has never had a fit before. My natives always say when dosing a dog "Take care of the breath, sir." And he had warned the boy with him to be careful of the breath just before he had the first fit.—Yours, etc.

DOUGLAS EDWARDS.

Spitzkop, January 31.

The following is the letter mentioned above:—Yesterday a herd of mine was engaged putting pipe ash and oil, moistened in his own mouth, into a dog's mouth that had taken a strychnine pill. Just at the critical moment the dog coughed, and some of its slime must have got into the herd's mouth. Within a few minutes he fell in a fit exactly similar to a dog when poisoned with strychnine. I arrived on the scene fully three hours after, and witnessed him having no less than nine fits. I administered a large bottle of mustard water, but without the desired effect; then a little brandy and water, a good nip, and about ten minutes later he spoke for the first time. He must have had fully 20 to 30 fits, the intervals becoming longer between each fit. After a few hours' rest he was able to walk slowly home. To-day he herded his flock. He says he had terrible pains in his back, and the pains went into his neck just before the fits came on. About a year ago another herd got quite queer for fully an hour, also while dosing a dog, just from inhaling its breath.

Poisoning Jackals—Yet Another Cute Dodge.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—I would also like to give my experience to my brother farmers *re* laying poison for jackals. And I think they will find my way a very easy and effective way of exterminating jackals. The poison which I use is strychnine, by Jacob Hulle, London, which I find a sure killer. This is how I work the oracle. Take the inside fat of a slaughtered animal, bray it in a mortar till it is one solid lump and pliable, then take a piece as large as a pigeon's egg, roll it between the palms of your hands till it is a round ball: then open with your pocket knife and insert the poison in the centre, squeeze the ball together again, put all your pills in a paper, and in a saddlebag, then start on horseback through your veld, and lay a pill every five hundred yards under a bush, always under the east side of the bush, so that the midday sun cannot get at it, as I leave these pills till they are picked up by the jackal, or by ants, etc.,

Now, the most important part is the laying of the poison. To lay it so that a jackal will pick it up, you must place a small handful of grass on the ground, and put your pill on the grass, and then light the grass. As it flares up round the pill the flame singes off all the smell of the hand and gives the pill at the same time a nice smell, which the jackal will trace a hundred yards off. I have never known a jackal to pass a pill made in that way. The advantage of laying poison that way does away with the drag you have to make, and the man on horseback can lay his whole farm full of poison in a couple of hours. It is also the cleanest way of working with poison that I know of. You will not find the jackal close to the poison, as the fat does not dissolve quick enough for that, but that he will die you can rest assured.—Yours, etc.,

S. P. Louw.

Hopetown, January 31.

Fertilisation of Turkeys.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—Can you or any of your readers please tell me the easiest way to caponise fowls? Is it necessary to stitch them up? What causes them to puff out with wind, between the skin and flesh, after being caponised? I notice in your last issue a letter from Mr. G. W. Turpin *re* the fertilisation of turkeys. I think "Poultryman," in your issue of December, 1908, made a slight error in saying that one act of coition is sufficient to fertilise the eggs for the whole season. It should read, one act of coition is sufficient to fertilise each batch of eggs, which means all the eggs laid before going broody.—Yours etc.,

POULTRY FARMER.

East Griqualand, February 10th, 1910.

Boring for Water.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—In order to make a decent living in South Africa, and particularly in the North-East, one of the most important questions for a farmer is how to find sufficient water. For it cannot be denied that the rainfall during recent years has decreased considerably, and accordingly many rivers, permanent fountains and many natural waters have ceased to provide the needs of the farmer. Where previously there was sufficient water to be met, at present nothing will be found. And where previously there was no water, and even no indication of it there, now an abundance of water is to be found. Where previously one would find strong fountains, there is now a borehole with a windpump. Perhaps it is asked why those fountains have been replaced by pumps. For the only reason that, on account of droughts, the water has gone down so far that it was not able to find its natural flow. Therefore one was obliged to use other means to bring the water to the surface, viz., by means of windpumps. And experience has taught us that, by deep boring, water is to be obtained anywhere. But the great question is to bore at the right place. And this is no doubt the cause of many unpleasant incidents between farmer and boring foreman. The last-mentioned always will turn away as far as possible from the "keerbank" (dike) for fear of getting on dolerite; and that is, in my opinion, the reason why we are not able to get strong waters everywhere. Of course, in some places it does not matter if one gets away a good distance from the "keerbank"; but in other places again experience has proved that water flows, as it were, in a pipe, and in such cases one should bore as near to the "keerbank" as possible. Some men in charge of a bore (from fear that they won't make their fortunes quickly enough) follow the bad practice of ceasing boring as soon as they get on hard stone, saying "we have struck dolerite," and "it is useless to go deeper; we won't get water here; besides we cannot bore in dolerite, it being too hard." That at least was said to me by a foreman. But the owner of the bore appearing on the scene ordered "you must bore through it," with the result that the so-called dolerite was bored through in half a day, when we got to the water. In most cases they cease boring, when reaching the hard bank, and then they leave off just where there is water, for almost in every case there is a hard bank before reaching water. I have also noticed that it is foolish to argue that iron stone cannot be bored, and that no water is to be found there. At our place a hole was bored by

a certain Mr. Van der Merwe. First of all he reached a 10 feet layer of brittle iron stone; having got through it, he was on a solid blue iron stone bank 3 feet thick; this was so hard that he scarcely could penetrate 12 inches per day, but he succeeded in getting through it; then followed grey stone (vaalklip), and soon afterwards the water. The hole was made to a depth of 60 feet, and has been provided with a large Samson pump, which is not able to master the water. I am convinced that many borers would have hesitated to go further on reaching the iron stone. This also proves clearly that in, or at least underneath dolerite, water may be found, and in large quantities. If we had more men like Mr. Van der Merwe (who is in the Barkly District with his bore) we should have a good supply of water on every farm. For he has proved that iron stone (whatever its hardness) may be mastered by a steel bore.

Another point of great importance in boring is to test properly the water one gets. Some people, after having tested the water for three or four hours, cease testing, thinking that it is sufficient. That, however, is a wrong idea. For in boring a hole where the surface forms a natural dam it is to be understood that the underground water is also dammed up. In such cases one should pump, say, 24 hours, and if possible more, in order to be sure that the underground dam having been pumped empty sufficient water will be supplied by the natural flow of the wateridge. I have seen in more than one case that the water has been tested for half a day without being reduced. Then people imagine that the water is sufficiently strong for a large pump. The windmill having worked for three or four days, the water becomes reduced, and the result is perhaps that one has only water for a small pump; but through ignorance one has suffered oneself to be deluded and to waste money on a pump, which is far too large for the water. Therefore it is in any case much better to make sure of your water by making a contract with your boreman and paying him extra for pumping the water for at least 24 hours. Then you will know exactly what is the strength of the water, and you will not have to spend money on what might prove a far too large pump. I shall be obliged if any of your readers will correct me where my opinion is wrong; or at least will also give their opinions on this important matter in order to enable those who have no experience in the matter to act carefully when boring for water. —Yours, etc.,

P. JOUBERT VILJOEN.

Cypherkuil, Hanover Road, C.C., 6th February, 1910.

Mudfish.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—In the January issue I notice a letter in which Mr. W. S. Turner expresses his surprise that Mr. N. C. Musto says that a fish can bury itself in mud. Would Mr. Turner be good enough and tell me whence fishes come after prolonged drought, if they die? After a rain one finds fishes in pools and dams where they were previously. If they did not bury themselves in mud, whence would they come so soon after the dam or pool having been replenished. Surely eggs could not be hatched out so quickly.—Yours, etc.,

J. VAN DER WALT.

Hartebeestfontein.

Circular Sheep Dips.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—I notice in the January issue of the *Journal* a letter of Mr. A. E. Bateson explaining why he finds the circular dipping tank best for sheep. From experience I must say that the circular dipping tank with a pillar in the centre is the best; but I want to add the following: From experience I know that by making the hole, three feet in length, three feet deeper where the sheep are placed into it, much dipping material is saved. Usually farmers make their dipping tanks sloping so as not to waste too much dip, but in the case of a troop of rams or goats they get caught by the large horns, the hole being too narrow. Therefore it is far better to have a straight tank and when the dipping is nearly finished one has only to work in the small part, and no thirty gallons of water are wasted.—Yours, etc.,

Abrahamskraal, 13th February, 1910.

A. J. DE BRUYN.

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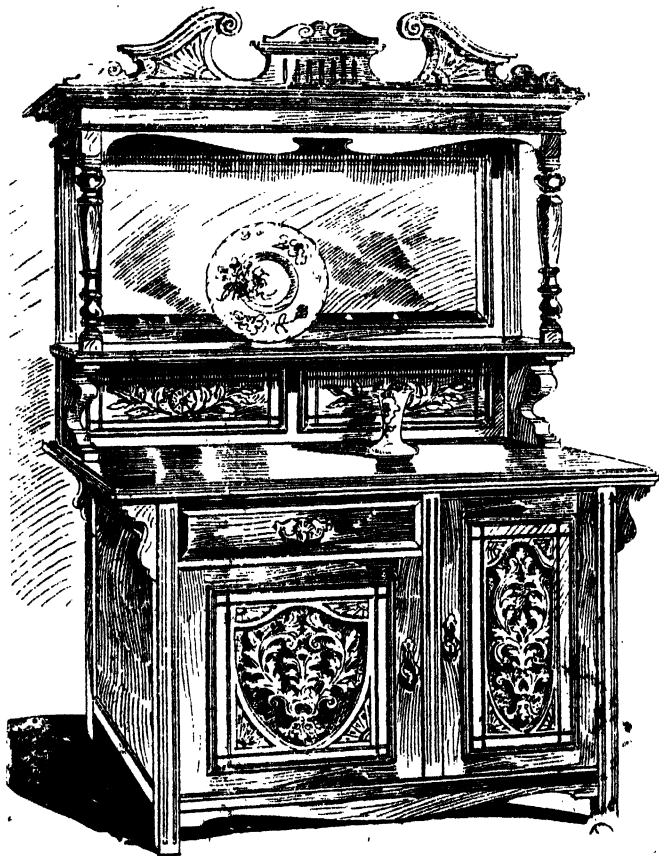
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— PORT ELIZABETH, C.C. —

NOTES ON THE WEATHER OF JANUARY, 1910.

By C. M. STEWART, B.Sc., Secretary to the Meteorological Commission.

Atmospheric pressure high for the season of year; mean temperature above the average, both days and nights being slightly warmer than usual; a moderate percentage of cloud, with an average number of fogs and mists; thunderstorms of about average frequency, with more hail than usual, but causing little or no damage; a marked prevalence of Southerly winds in the West of greater strength than usual, with a mean rainfall slightly the average, particularly in the West and South-West, with excesses in the more Northerly and Easterly portions of the country, were the most noteworthy points in connection with the weather of January, 1910.

DIVISION.	Mean Rainfall (1910).	Mean No. of Days.	Average Rainfall (1891- 1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ...	0.10	1	1.24	4	-1.14	-92
South-West ...	0.46	2	0.79	3	-0.33	-42
West Coast ...	0.11	1	0.27	1	0.16	-59
South Coast ...	1.42	6	1.93	7	-0.51	-26
Southern Karoo ...	0.70	3	0.51	2	+0.19	+37
West Central Karoo ...	1.27	4	0.87	3	+0.40	+46
East Central Karoo ...	1.35	5	1.90	5	-0.55	-29
Northern Karoo ...	1.80	7	1.65	4	+0.15	+9
Northern Border ...	1.64	5	2.04	5	-0.40	-20
South-East ...	3.24	10	3.48	9	-0.24	-7
North-East ...	4.01	11	3.75	8	+0.26	+7
Kaffraria ...	5.33	13	4.36	11	+0.97	+22
Basutoland ...	8.14	15	5.20	12	+2.94	+57
Orange River Colony ...	...	...	3.16	7	...	...
Durban (Natal) ...	3.99	15	5.12	...	-1.13	-22
Bechuanaland ...	4.13	8	3.93	8	+0.20	+5
Rhodesia ...	1.53	8	5.88	12	-4.35	-74

Precipitation during the month, as shown by 347 stations, amounted on the mean to 2.27 ins. on 7 days, being 0.20 ins. or 8 per cent. less than the normal depth. This amount is 1.22 ins. below the mean for December, and 0.63 ins. below the corresponding quantity for January of last year. It will be seen from the accompanying table that the mean sectional rainfall was less than usual over nine (9) of the 16 divisions. The deficiency was greatest in the South and West of the Cape Colony and in Rhodesia, amounting to 92 per cent. over the Cape Peninsula; it was still fairly large (20-30 per cent.) over the East Central Karoo, Northern Border, and at Durban (Natal), but diminished to 7 per cent. over the South-East. The actual excess was greatest (2.94 ins.) in Basutoland, being equivalent to 57 per cent., but elsewhere was not very large, although the percentage surplus varied from 5 per cent. over Bechuanaland to 46 per cent. over the West Central Karoo. Compared with last month there was a large falling off in the amount registered over most of the divisions, with the exception of the Northern Border, North-East, Kaffraria and Basutoland, which showed increased totals for this month. A comparison with January, 1909, shows a practically similar diminution of precipitation registered over most of the sections, increased amounts, however, falling over West Central Karoo, Northern Border and Basutoland, while East Central Karoo and Kaffraria had the same means as during that month. Arranging the 347 stations according to the varying amounts recorded for the month, it is seen that 27, chiefly in the first three sections, show returns of "nil," 57 had 0.01-0.50 ins., 43 had 0.51-1.00 ins., 64 had 1.01-2 ins., 52 had 2.01-3 ins., 44 had 3.01-4 ins., 21 had 4.01-5 ins., 15 had 5.01-6 ins., 11 had 6.01-7 ins., 5 had 7.01-8 ins., 3 each had 8.01-9 ins., and 9.01-10 ins., the two largest remaining totals being 10.84 ins. at Teyateyaneng and 11.84 ins. at Qacha's Nek, both in Basutoland, Insikeni being third with 9.95 ins. Although the totals were large in many instances, as already shown, the maximum amounts recorded were by no means excessive, the greatest being only 2.94 ins. at Stutterheim on the 18th. Summarising these it is found that of 321 stations furnishing details, 135, or a little over 42 per cent., had 0.00-0.50 ins., 83 had 0.51-1.00 ins., 88 had 1.01-2 ins., and 15 exceeded 2 inches, being confined to the North and Eastern portions of the country.

Thunderstorms were not so numerous as during the corresponding month of 1909, but were in excess of those reported during December last. In all 570 instances of this occurrence were noted on 28 days of the month, most widely on 17th, 18th, 30th, 27th, 8th, 9th and 5th. No damage was noted as occurring with these storms. *Hail* was noted as occurring at 40 stations on 13 days, principally 25th, 30th, and 31st. The number of cases of this phenomenon was much larger than during either last month or January, 1909. The only damage noted was that caused to tobacco at Poplar Grove (Queenstown) during a storm of short duration there on 17th, although a few stones the size of pigeon's eggs fell in Elliot district during storms there. No *Snow* or *Sleet*.

Temperature, Cloud and Wind.—The mean monthly temperature of all stations was 68.9° or 3.2° higher than the preceding month, but 1.8° lower than the previous January. The mean of the day temperatures was 78.8° and of the night temperature 59.0° , these values being 2.9° and 3.4° respectively higher than during December last, but 1.5° and 1.2° respectively lower than during January of the previous year. Compared with the normal the monthly temperature was 0.4° higher than usual, the mean maximum being 0.5° and the mean minimum 0.3° respectively above the average. There was a mean daily range of 19.3. At the individual stations, the mean monthly temperature was mostly above the average by about 1° , the excess ranging, however, from 0.0° at Bedford to 3.2° at Ookiep, and 2.4° at Queenstown. At the coast stations, however, the mean temperature was mostly less than usual by a few tenths, ranging from 0.2° at Cape St. Francis to 1.3° at Port Nolloth (and inland at Uitenhage). The mean day temperatures were above the average at more than half the stations by amounts ranging from 0.1° at East London to 4.2° at Queenstown, and below the average at the others by mostly 1–2 degrees, the deficit falling to 0.3° at Port St. John's and the mean being normal at one or two stations along the South Coast. The night temperatures were also above the normal at the majority of stations by more than one degree, the excess varying from 0.1° at Amalienstein, Evelyn Valley and Umtata to 2.7° at Ookiep and Port St. John's. At the mountain stations in the Cape Peninsula, at a few on or near the South and South-East Coast, Aliwal North and Hanover, the mean minima were below the average by mostly one degree or more, the deficits varying, however, between 0.1° at Disa Head and 2.0° at East London, and 2.6° at Hanover. The mean warmest station was Mochudi, with a temperature of 75.2° , and the mean coolest Disa Head, with 60.2° , a difference of 15° . The highest temperatures of the month were principally registered during a warm spell from 2nd to 10th, also on 16th to 18th and 23rd to 30th, most numerous on the 23rd. The lowest temperatures were registered on 13 days, 1st, 2nd, 4th, 10th, 16th, 21st to 29th, but most widely on 26th and 27th. The mean value of these extreme readings was 92.4° and 49.7° , showing a mean monthly range of 42.7° . The mean of the highest readings was 2.7° respectively above and 1.7° below the corresponding values for December last and January of the previous year; whilst the mean of the lowest readings was 3.2° above but 3.3° below the corresponding values for these same months. Temperatures of 100° or over were recorded at 7 stations, the highest reading being 105.0° on 4th at Bedford. The lowest reading was 41.0° on 28th at Hanover, the extreme monthly range, therefore, being 64.0° . No instance of *Frost* was noted during the month. At Retreat, in the Cape Peninsula the mean minimum temperature on grass was 54.9° or 5.6° lower than the mean shade minimum, the readings ranging from 63.2° on 6th to 42.3° on 12th. The intense heat at the beginning of the month is reported to have caused much damage to fruit, particularly grapes at Umtata, where the loss in one vineyard is estimated at about £1,500. The mean percentage of *Cloud* was only 43, being 8 per cent. less than last month and 10 per cent. less than during the previous January. Taken as a whole, the skies were much clearer than usual, the mean amount of obscuration being greatest, about 55 per cent., over the South-East and Kaffraria; between 45 and 50 per cent along the South Coast, the West Coast and in Rhodesia; 30–35 per cent. over the North-East, Southern Karoo and the South-West; and decreasing to 25–30 per cent. over Bechuanaland and the Cape Peninsula. Cloudiness varied from 15 per cent at Groot Drakenstein to 75 per cent. at Stutterheim. The number of *Fogs* and *Mists* noted this month was practically the same as in December last, but only about two-thirds the number in January of last year. In all, 135 instances of this phenomenon were reported, occurring at one or more stations on each day of the month, but most widely on 31st, 6th and 10th. The prevalent morning *Winds* were Southerly (S.E. to S.W.) along the West Coast, East at Danger Point and Cape Agulhas, Westerly along the South Coast and for some distance inland, S.W. at Durban; inland, they were Easterly at Amalienstein, S.E. at Bedford, Aliwal North and Hope Fountain; N.E. at Mochudi; and Westerly (N.W. to S.W.) at most of the other stations, but calm at Queenstown. The mean *Force* on the Beaufort Scale was 2.09, being slightly more than in January, 1909, but practically the same as in December last. Expressed in terms of the new and revised equivalents* of the numbers of the scale, this force corresponds to a velocity of 8.3 miles per hour. The winds were strongest in the West and South, but were about one-third less in the East and North. The Royal Observatory records show a large excess of South winds with a small excess of those from W. and E.S.E., but a marked decrease in those from all other directions, particularly N.W. The mean

morning velocity there (in terms of the more recent equivalents) was 8·7 miles per hour. The wind was reported to have attained the force of a *Gale* at 12 stations on 9 days, the Southerly gale on the 31st causing serious damage to fruit at Vruchtbaaar and Groot Drakenstein. Two *Duststorms* were noted on 17 and one *Hot Wind* on 6th.

The mean pressure at the Royal Observatory was 29·98 ins., or 0·03 ins. higher than usual, ranging from 29·81 on the evening of 16th to 30·18 on evening of 25th.

OBSERVERS' NOTES.

VRUCHTBAAR. -A month of South-Easter and heat. The wind, with the exception of the 31st, was never strong, but that last day of the month it played havoc with fruit trees and vines. Grape and fruit crops all round much lighter than usual.

THE TOWERS (Malmesbury).--Hot and very dry. South-Easters daily.

"THE LANDS" (Richmond).--Crops very fair, though retarded by drought during two preceding months. Prevalent winds have been during this month South-East and East. The amount of cloud has been remarkable, nearly every day, but not much precipitation, though heavy dews on most nights.

THEEFONTEIN (Hanover).--Rains very local, falling mainly from isolated clouds and on the track of first shower. Drought still continues in greater part of district. Heat wave first week of month, 5th being particularly sultry (thermometer 88° in house and 101° in shade outside). Locusts (thiers and hoppers) reported on some farms. Winds light and variable. Duststorms on 17th.

HUXLEY (Stutterheim).--The weather keeps too dry for agriculture, very few mealies will be reaped here this season. We have had 1·83 ins. less rain for the month than last year. Stock is doing well.

CLIFTON (Sterkstroom).--Splendid rains, though rather much. Sheep getting fever.

POPLAR GROVE (Queenstown). Very large hail on 17th; did not last long. Tobacco damaged considerably.

SUNNYMEADE (Albert).--Lovely rains, although still partial. Veld and stock looking well. Hail very prevalent during month.

ELLIOT.--Several severe hailstorms in district (one or two stones as large as pigeon's eggs).

ARMADILLO CREEK (Vryburg). The rainfall has been opportune and sufficient for crops and veld. A 4 in. monthly summer rainfall is ideal for Bechuanaland. No mealies were planted before Christmas owing to rains being late, but crops are coming on at a great pace now. Several swarms of "Brown" flying locusts have passed over from the Kalahari travelling S.E., but besieged all the way by birds, a great number embracing the great white locust bird, the sable and the small locust bird; also thousands of Molopo Hawks and Locust Kestrels.

NOTTINGHAM (Mafeking). The rainfall this month compared very badly with that of January last year when 10·51 inches fell here. The veld, however, is beautiful and all classes of stock in splendid condition.

GROOT DRAKENSTEIN.--Mean temperature of month 25° above average of 10 years (1899-1908) but 1·6° below that of last year. Rainfall of month 1·62 ins. below or only one-seventh of average. The gale on the 31st, which continued until the morning of the 1st February, played great havoc with the fruit crop, pear trees being literally stripped. Hundreds of tons were blown off.

UMTATA.--Rainfall 4·87 ins. against 2·88 ins. for January last year. Country looking well. Crops are making good headway and harvesting prospects are brighter. Intense heat during first week of month did much damage to fruit, more especially grapes, a local farmer having had a large vineyard, from which he reckoned on making about £2,000, so severely scotched that he can now only gather about 25 per cent of them. Early mealies in most cases have been destroyed by grubs this season. Stock looking well.

MOUNT AYLIFF.--Since my last report a great deal of ground has been ploughed and sown. If the frost keeps off till late there should be a moderate crop.

CARNAVON FARM.--It will be seen from the subjoined table that we have only an average of 3·12 for January in last 10 years, 1910 being 2½ above the average. Wind, only 1 windy day against an average of 6. *No Clouds* and *Frost*, nil. The rains for this month have been remarkably evenly distributed; several washaways and two severe hailstorms have "thrown a damper" on an otherwise useful rainy month. The mealie crop, though not so large as it should have been, seems pretty safe. Locusts and the large locust bird have disappeared, though the small "swallow tail" locust birds have put in an appearance in limited numbers. Stock has fallen off considerably during last three weeks (too much wet). Why has the Locust Bureau ceased to give monthly statistics as to where locusts are and what they are doing? But for an occasional wire from "Armadillo Creek," Vryburg, re locusts travelling south from the Kalahari, we should be in utter

* The old equivalents, which were too high, have been in use hitherto, but will in future be replaced by the new values.

and outer darkness. A monthly bulletin is what we *must* have. It is a life and death question to farmers to know what the locust plague is and is likely to be.

	Rain.	Wind.	Frost.	No Clouds.	Rainy Days.
1901	76	12	1	0	3
1902	129	8	0	0	5
1903	72	11	1	0	3
1904	721	5	0	1	12
1905	333	5	0	1	7
1906	135	5	0	0	7
1907	197	4	0	0	13
1908	217	9	2	1	8
1909	700	2	0	0	19
1910	541	1	0	0	14
Totals	3121	62	4	3	91
Means	312	6	$\frac{1}{2}$	$\frac{1}{3}$	9

STATIONS.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory	79.1	61.7	70.4	92.8	23	53.0	1
Cape Town (S.A.C.)	81.9	61.5	71.7	96.5	23	54.0	1
Do. City Hospital	79.0	60.0	69.5	96.0	23	55.0	1, 10 & 24
Table Mountain (Disa Head)	67.4	52.9	60.2	85.5	23	44.0	26
Do. (Devil's Peak)	72.9	54.0	63.4	84.0	8	43.0	2
Wynberg	75.3	59.7	67.5	91.5	8	54.0	27
Groot Constantia	74.2	59.1	66.6	87.0	9	53.0	25
Retreat	77.4	60.5	69.0	91.2	8	52.9	1
Simon's Town	77.1	64.7	70.9	88.0	23	59.0	25, 26 & 28
Robertson Plantation	83.9	59.7	71.8	100.0	8	46.0	25
Danger Point	71.4	60.9	66.2	78.0	8	52.0	26
Elsenberg (Agri. College)	81.5	56.8	69.2	96.2	23	49.0	26
Groot Drakenstein	85.4	61.0	73.2	101.0	23	48.9	10
Port Nolloth	65.0	52.2	58.6	76.0	26	43.5	26
O'okiep	87.3	59.6	73.4	99.2	23	48.0	28
Concordia (Plantation)	76.8	58.9	67.9	92.0	17	49.5	27
Storms' River	75.3	57.7	66.5	91.0	16	48.4	27
George (Plantation)	73.6	58.6	66.1	85.0	17	50.0	27
Mossel Bay	75.3	62.7	69.0	80.0	18	53.0	1
Cape Agulhas	73.4	62.9	68.2	76.0	7, 17, 24 & 30	55.0	1 & 28
Port Elizabeth	75.4	62.9	69.2	81.0	9	55.0	26 & 27
Cape St. Francis	72.9	62.8	67.8	77.0	9	53.0	1
Uitenhage	82.7	58.7	70.7	104.2	24	49.7	29
Van Staaden's	77.5	59.4	68.4	99.0	25	48.0	27
Amalienstein	87.4	59.2	73.3	99.0	8	46.0	26
Hanover	87.0	51.1	69.0	96.0	4	41.0	28
East London	75.1	62.9	69.0	80.0	5 & 10	55.0	27
Chiselhurst	84.4	62.0	73.2	95.0	6	54.0	25
Bedford	81.6	57.6	69.6	105.0	4	43.0	27
Sydney's Hope	77.9	58.2	68.0	99.5	24	49.0	26 & 27
Cathcart	77.9	54.1	66.0	95.1	3	41.6	26
Stutterheim	79.6	58.7	69.2	103.6	3	48.3	21
Evelyn Valley	73.8	53.4	63.6	94.0	3	42.0	16
Aliwal North	86.3	55.3	70.8	97.5	4	46.0	27
Queenstown	85.2	58.4	71.8	102.0	3	46.0	27
Mount Ayliff	80.4	58.4	69.4	98.0	2	48.0	26
Main	78.0	58.3	68.2	99.8	3	45.3	26
Port St. John's	78.9	65.8	72.4	87.0	9	60.0	22
Umtata	81.1	60.3	70.7	101.0	2 & 3	52.0	22
Tabankulu	75.8	56.4	66.1	93.3	2	46.4	26
Mochudi	88.1	62.4	75.2	95.0	27	55.0	24
Kuruman	87.0	56.3	71.6	95.0	16	47.0	4
Hope Fountain	80.4	58.7	69.6	91.0	29	53.1	24
Means	78.8	59.0	68.9	92.4	...	49.7	...
Extremes	...	...	...	105.0	4	41.0	28

RAINFALL, JANUARY, 1910.

I. CAPE PENINSULA :

	INS.
Royal Observatory (a) 12in. gauge	0·01
Cape Town, Fire Station...	0·00
Do. South African College	0·00
Do. Molteno Reservoir ...	0·04
Do. Platteklip ...	0·10
Do. Signal Hill ...	0·00
Do. Hospital ...	0·00
Sea Point, The Hall ...	0·00
Camp's Bay ...	0·35
Table Mountain, Disa Head ...	0·36
Do. Kasteel Poort...	0·39
Do. Waai Kopje ...	0·40
Do. St. Michael's ...	0·43
Devil's Peak, Blockhouse ...	0·07
Do. Nursery ...	0·04
Woodstock (The Hall) ...	0·03
Newlands, Montebello ...	0·00
Kenilworth ...	0·00
Wynberg, St. Mary's ...	0·05
Groot Constantia ...	0·00
Tokai Plantation ...	0·07
Simon's Town ...	0·19
Cape Point... ..	0·03
Robben Island ...	0·00
Durbanville ...	0·08
Maitland Cemetery ...	0·00
Tamboers Kloof ...	0·00
Woodhead Tunnel... ..	0·14
Lower Reservoir ...	0·03
Maclears Beacon ...	0·03
Waai Vlei ...	0·10
Woodhead Dam ...	0·41
Retreat ...	0·03

II. SOUTH-WEST :

Eerste River ...	0·00
Klapmuts ...	0·16
Stellenbosch, Gaol ...	0·00
Somerset West ...	0·00
Paarl ...	0·16
Wellington, Gaol ...	0·38
Groot Drakenstein, Weltevreden	0·28
Tulbagh ...	0·06
Kluitjes Kraal ...	0·06
Ceres ...	0·00
Rawsonville ...	0·08
Caledon ...	0·45
Worcester, Gaol ...	0·36
Hex River ...	0·53
Karamelks River ...	0·55
Lady Grey, Div. Robertson ...	0·83
Robertson, Gaol ...	2·61
Do. Govt. Plantation ...	1·64
Montagu ...	1·72
Danger Point ...	0·10
Elgin Plantation ...	0·34
Roskeen ...	0·06
Vruchtbaar ...	0·20

III. WEST COAST :

Port Nolloth (Lieut. Barber) ...	0·00
Anenous ...	0·05
Klipfontein ...	0·10

III. WEST-COAST (continued) :

	INS.
Kraaifontein ...	0·00
O'okiep ...	0·00
Springbokfontein ...	0·00
Garies ...	0·00
Van Rhyn's Dorp ...	0·00
Clanwilliam, Gaol ...	0·53
Dassen Island ...	0·00
The Towers ...	0·00
Malmesbury ...	0·07
Piquetberg ...	0·00
Wuppertal ...	0·45
Hopefield ...	0·00
Algeria (Clanwilliam) ...	0·42
Cedarberg (do.) ...	0·27

IV. SOUTH COAST :

Cape Agulhas ...	0·34
Bredasdorp... ..	0·76
Swellendam ...	2·92
Grootvaders Bosch ...	3·65
Riversdale ...	0·45
Vogel Vlei ...	0·40
Mossel Bay... ..	0·68
Gr at Brak River... ..	1·59
George ...	3·38
George (Plantation) ...	3·42
Woodfield (George) ...	2·36
Millwood ...	1·52
Sour Flats ...	1·77
Concordia ...	1·23
Buffel's Nek ...	2·22
Plettenberg Bay ...	0·68
Harkerville ...	1·10
Blaauwkrantz ...	3·08
Lottering ...	3·81
Storm's River ...	2·73
Witte Els Bosch ...	2·30
Humansdorp ...	0·74
Cape St. Francis ...	0·51
Witteklip (Sunnyside) ...	1·10
Van Staden's (Intake) ...	0·73
Do. (On Hill) ...	0·88
Uitenhage (Gaol) ...	0·58
Do. (Park) ...	0·68
Do. (Inggs) ...	0·78
Dunbrody ...	1·42
Port Elizabeth (Harbour) ...	0·68
Do. (Walmer Heights) ...	1·06
Shark's River (Nursery)...	0·69
Centlivres ...	0·61
Edinburgh (Knysna) ...	1·25
Kruis River ...	0·57
The "Slip" (Port Elizabeth) ...	0·63
Gamtoos Station ...	0·60

V. SOUTHERN KAROO :

Ladismith ...	0·87
Amalienstein ...	1·99
Calitzdorp ...	0·48
Oudtshoorn ...	0·57
Vlaakte Plaats ...	0·61
Unionsdale ...	0·30

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CAPE TOWN.

VI. WEST-CENTRAL KAROO : INS.

Fraserburg Road	0.40
Prince Albert	1.78
Beaufort West, Gaol	1.96
Dunedin	1.16
Nel's Poort	1.16
Camfers Kraal	0.94
Krom River	2.47
Roo's Plaats	0.60
Baaken's Rug	0.89
Willowmore	1.20
Rietfontein	1.83
Steytlerville	1.31
Lemoenfontein	0.77

VII. EAST-CENTRAL KAROO.

Buffels Kloof	2.07
Aberdeen, Gaol	1.58
Aberdeen Road	0.68
Klipplaat	0.59
Kendrew, Holmes	0.64
Do.	0.58
Graaff-Reinet, Gaol	1.37
Do. (Eng. Yard)	1.26
New Bethesda	0.95
Roodeloem	1.06
Glen Harry	1.72
Wellwood	1.28
Do. Mountain	1.15
Jansenville	0.47
Rode Hoogte	1.88
Toegedacht	0.72
Klipfontein	1.25
Pearston	0.70
Middlewater	1.07
Somerset East, Gaol	2.78
Middleton	1.23
Spitzkop (Graaff-Reinet)	1.92
Muchputfontein	3.72
Zeekoe River	1.79

VIII. NORTHERN KAROO :

Calvinia	0.00
Middlepost	0.00
Sutherland	0.09
Fraserburg	0.80
Carnarvon	0.38
Brakfontein	0.88
Victoria West	0.33
Britstown	2.19
Wildebeestkooij	0.67
De Kruis (Murraysburg)	1.37
Richmond	1.46
Hanover	2.05
Theefontein	2.13
Philips town	2.64
Petrusville	1.67
The Willows (Middelburg)	1.51
Colesberg	1.30
Tafelberg Hall	1.16
Fish River	1.76
Varkens Kop	1.92
Craddock (Gaol)	3.15
Witmoos	1.97
Maraisburg	1.27
Steynsburg (Gaol)	2.50
Tarkastad	2.32
Drummond Park	2.97

VIII. NORTHERN KAROO (con.) : INS.

Waverley	3.59
Schuilhoek	2.31
Vosburg	0.38
Zwavelfontein	0.50
The Lands (Dassiefontein)	2.20
Hartebeestfontein (Steynsburg)	3.42
Willow Walk (Tarka)	3.55
Hotweg Kloof (Craddock)	2.11
Thebus Waters	2.98
Bultfontein (Colesberg)	2.75
Rieghtersfontein	4.16

IX. NORTHERN BORDER

Pella	0.68
Kenhardt	0.30
Trooilapspan	1.58
Van Wijk's Vlei	0.01
Prieska	0.42
New Year's Kraal	2.05
Dunmurry	2.14
Karree Kloof	2.20
Griquatown	2.50
Douglas	2.15
Hope Town	1.84
Orange River	0.94
Newlands, Barkly West	2.07
Barkly West	2.38
Kimberley (Gaol)	3.94
Stoffkraal	0.32
Douglas (Vos)	1.99
Rocklands	2.47

X. SOUTH EAST :

Melrose (Div. Bedford)	2.65
Dagga Boer	2.26
Fairholt	2.82
Lynedoch	2.56
Alicedale	2.87
Cheviot Fells	1.98
Bedford (Gaol)	3.75
Do. (Hall)	3.55
Sydney's Hope	1.94
Cullendale	3.17
Adelaide	2.56
Atherstone	1.28
Alexandria	0.59
Fort Fordyce	5.12
Graham's Town (Gaol)	1.09
Heatherdon Towers	0.66
Sunnyside	1.08
Fort Beaufort	2.77
Katberg	5.15
Balfour	3.23
Seymour	2.57
Glencairn	3.34
Port Alfred	0.22
Hogsback	7.40
Peddie	1.82
Exwell Park	2.13
Keiskamma Hoek	3.70
Cathcart (Gaol)	3.68
Cathcart (Forman)	3.99
Cathcart	3.59
Thaba N'doda	2.77
Evelyn Valley	8.04
Crawley	2.99
Thomas River	3.00

X. SOUTH EAST (*continued*) :

INS.

Perie Forest	6.17
Forestbourne	6.52
Isidenge	4.57
Kologha	4.50
King William's Town (Gaal)	2.14
Stutterheim	5.80
Fort Cunynghame	3.24
Kubusie	4.40
Quacu	2.63
Blaney	1.55
Bolo	3.14
Fort Jackson	0.99
Komgha (Gaal)	1.54
Chiselhurst	1.31
East London West	1.05
Cata	5.53
Wolf Ridge	5.37
Dontash	6.19
Mount Coke	1.65
Blackwoods	3.24
Albert Vale (near Bedford)	2.62
Huxley Farm, Stutterheim	1.90
Amabele Junction	4.52
Inzileni	4.83

XI. NORTH-EAST :

Venterstad	2.41
Mooifontein	2.80
Burghersdorp (Gaal)	2.96
Moltano	3.42
Broughton	3.18
Thibet Park	4.16
Sterkstroom (Station)	6.36
Rocklands	3.37
Aliwal North (Gaal)	2.10
Poplar Grove	2.99
Carnarvon Farm	5.41
Halseton	3.08
Jamestown	4.33
Whittlesea	3.88
Queenstown (Gaal)	3.61
Middlecourt	5.12
Dordrecht	4.65
Herschel	4.62
Lauriston	4.49
Lady Frere	5.38
Contest (Near Bolotwa)	3.75
Keilands	3.25
Barkly East	3.33
Cliftonvale	4.73
Hughenden	1.71
Glenwallace	6.00
Indwe (Collieries)	5.56
Hopewell (Invani)	3.77
Sunnymeade (Div. Albert)	3.55
Clifton (Sterkstroom)	6.10
Edendale	4.11

XII. KAFFRARIA.

INS.

Ida (Xalanga)	6.90
Slaate (Xalanga)	7.24
Cofimvaba	3.37
Tsomo	3.11
N'qamakwe	3.58
Main	3.84
Engoobo	5.68
Butterworth	1.61
Woodcliff	9.13
Kentani	1.25
Maclear	8.81
Idutywa	0.96
Bazeya	7.82
Willowvale	2.43
Mount Fletcher	6.31
Somerville (Tsolo)	4.42
Elliotdale	1.29
Cwebe	2.49
Tabankulu	8.64
Kokstad	9.26
Seteba	6.98
Flagstaff	5.32
Insikeni	9.95
Port St. John's	3.73
Umzimkulu	4.32
Maclear (Station)	7.60
Tabankulu (Atkins)	7.96
Umzimkulu (Strachan)	4.79
Wanstead	4.36
Lusikisiki	3.20
Elliot	5.40
Tent Kop (Elands Height)	6.40
Waterfall Farm (Kokstad)	6.72
Elton Grange	6.47

XIII. BASUTOLAND :

Mafeteng	4.58
Mohalies Hoek	5.64
Teyateyaneng, Bera	10.51
Qacha's Nek	11.84

XIV. NATAL :

Durban, Observatory	3.99
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XV. BECHUANALAND :

Taungs	6.00
Vryburg	3.36
Mafeking	4.27
Kuruman	2.83
Zwartlaagte	4.24
Nottingham	3.36
Masilibitsani	4.96
Armadillo Creek	3.85
Mochudi	4.33

XVI. RHODESIA :

Hopefontain	1.71
Rhodes Matopopo Park	1.35

CURRENT MARKET RATES (WHOLESALE) OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 19th February, 1910, ruling at the several centres named, is published for general information.

CENTRE	A. Wheat per 100 lbs.	B. Wheat Flour per 100 lbs.	C. Roor Meal per 100 lbs.	D. Mealies per 100 lbs.	E. Mealie Meal per 100 lbs.	F. Barley per 100 lbs.	G. Oats per 100 lbs.	H. Oat-hay per 100 lbs.	J. Lucerne Hay. per 100 lbs.	K. Potatoes per 100 lbs.	L. Tobacco (Boer Roll) per lb.	M. Beef per lb.	N. Mutton per lb.	O. Fresh Butter per lb.	P. Eggs per doz.	Q. Cattle (Slaughter) per lb.	R. Sheep (Slaughter)
Alwal North..	£ s. d. 0 9 6	£ s. d. 1 1 6	£ s. d. 0 12 6	£ s. d. 0 5 9	£ s. d. 0 7 6	£ s. d. 0 9 6	£ s. d. 0 9 6	£ s. d. 0 3 3	£ s. d. 0 3 3	£ s. d. 0 7 0	£ s. d. 0 1 0	£ s. d. 0 0 6	£ s. d. 0 0 4	£ s. d. 0 1 3	£ s. d. 0 0 7	£10 £9	13/- 12/-
Beaufort West	0 10 0	0 17 0	0 13 9	0 6 6	0 8 0	0 11 0	0 8 0	0 4 0	0 4 0	0 6 6	0 1 0	2d., 3d.	3d., 4d.	0 1 3	0 1 4	£9	12/6
Burgersdorp	0 8 6	0 17 6	0 12 9	0 6 9	0 7 9	0 6 0	0 6 0	0 4 0	0 4 0	0 6 6	0 1 0	0 0 6	0 0 3	0 0 11	0 1 0	£9	12/6
Cape Town ..	..	..	..	..	..	0 6 6	0 5 0	0 3 0	0 5 3	0 6 6	..	..	..	0 1 3	0 1 6	..	..
Clanwilliam ..	11/4 to 12/-	..	11/6 to 13/-	..	0 7 0	..	0 3 0	..	..	0 8 0	0 0 9	0 0 5	3d. to 5d.	0 1 0	0 1 0	..	10/-
Colesberg ..	0 16 3	..	0 13 6	0 6 0	..	0 8 0	0 7 6	0 4 0	0 3 0	0 6 6	0 0 6	0 0 3	0 0 3	0 0 6	0 1 0	..	..
Crook ..	0 10 6	..	0 13 6	0 6 3	0 7 6	0 9 0	0 8 0	0 5 0	0 6 0	0 6 0	0 1 0	0 0 3	0 0 3	0 0 9	0 1 0	£7 10s.	17/6
Dordrecht ..	0 9 0	1 1 0	0 16 0	0 6 0	0 7 6	0 9 0	0 8 0	0 4 0	0 6 0	0 7 0	0 1 0	0 0 3	0 0 3	0 0 9	0 1 0	£10	18/-
East London ..	0 9 0	0 18 0	0 15 0	0 6 0	0 7 9	0 8 6	0 5 6	0 4 0	0 2 0	0 7 0	..	0 0 3	0 0 3	0 0 10	0 1 4	£5 10s.	..
Grass. Reinet ..	0 11 6	..	0 13 6	0 6 4	..	0 7 6	0 5 0	0 5 0	0 5 0	0 7 0	0 0 5	0 0 4	0 0 4	0 0 1	0 1 4	£7 15s.	11/3
Grahamstown ..	0 10 9	0 16 3	0 14 0	0 4 6	0 5 9	0 6 3	0 6 9	0 5 6	0 4 9	0 10 0	0 0 5	0 0 8	0 0 5	0 0 10	0 1 0	£7 15s.	11/3
Kimberley ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
King William's Town ..	0 9 0	0 18 0	0 15 0	0 5 6	0 7 0	0 8 6	0 8 0	0 4 6	0 4 0	0 4 6	0 0 4	0 0 4	0 0 4	0 0 9	0 1 4	£9 10s.	12/3
Matlabury ..	0 10 3	0 15 0	0 12 6	0 7 6	..	0 7 6	0 4 6	0 2 10	..	0 6 9	0 0 9	0 0 6	0 0 5	0 0 1	0 1 0	£12	16/6
Mossel Bay ..	0 12 9	0 18 6	0 14 0	0 6 6	..	0 6 0	..	0 4 6	..	0 4 0	0 0 4	0 0 6	0 0 6	0 0 1	0 1 0	£13	13/-
Port Alfred ..	0 13 0	0 1 0	0 19 0	0 7 0	0 10 0	0 10 0	0 8 0	0 5 0	..	0 9 0	0 0 6	0 0 6	0 0 6	0 0 1	0 1 0	..	..
Port Elizabeth ..	0 10 0	..	0 19 0	0 6 6	0 8 0	0 6 0	0 6 3	0 5 0	..	0 9 0	0 0 6	0 0 6	0 0 6	0 0 1	0 1 0	..	..
Queenstown ..	0 9 6	1 2 0	0 13 0	0 5 0	0 9 0	0 7 0	0 9 0	0 4 0	0 3 6	0 5 0	0 1 0	0 0 4	0 0 4	0 0 9	0 1 3	£7	15/-
Tarleton ..	..	..	..	..	0 13 0	0 7 0	0 4 6	0 4 0	0 3 6	0 5 0	0 0 4	0 0 4	0 0 4	0 0 9	0 1 3	..	..
Vryburg ..	0 14 0	0 1 0	0 12 6	0 4 0	0 6 6	0 9 0	0 8 6	0 6 0	0 5 6	0 8 0	0 0 4	0 0 8	5d. to 7d.	0 1 6	0 1 0	£8 to £10	9/- to 12/-
Worcester ..	0 11 0	0 15 6	0 12 6	0 8 0	0 9 0	0 7 0	0 5 4	0 3 3	0 4 6	0 5 0	0 0 6	3d. to 5d.	0 0 4	0 1 0	0 1 3	£8 10s to £10	15/-

NOTE.—A blank space denotes "no transactions."

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Diamonds, £11 10s.



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Diamond, £15, £20,
£30, £40.



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73, Burg Street, CAPE TOWN. **TWO DOORS FROM CENTRAL FIRE STATION**

PRODUCE MARKETS.

CAPE TOWN.

The Produce Department of the firm of R. Müller, Cape Town, reports under date of the 1st of March as follows, viz. :—

Wool.—The season having advanced, but moderate quantities are arriving here, which, however, are purchased at highly satisfactory prices, qualities duly taken into account. The market continues very firm. I am here giving the following highest ruling prices, viz. :—Piquetberg Lambs Wool, 7½d.; Piquetberg, Coarse and Coloured, 3½d.; Malmesbury, 7½d.; Piquetberg Summer, 6½d.; Calvinia, 7½d.; Hopefield, 6½d.; Karoo, 8½d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld ...	0	6	0	9½	Wool for Washing ...	0	4½	0	7½
Do. Karoo ...	0	6	0	7½	Snow-white Super to Extra	1	4	1	9
Medium ...	0	5	0	6½	Do. Ordinary ...	1	2	1	5
Short and inferior ...	0	3	0	4½	Fleece Washed ...	0	0	0	10

Mohair.—The amount of business doing is very limited, but prices remain steady.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer ...	0	6	1	1	Winter ...	0	9	0	9½
Kids ...	1	3	1	8	Do. Kids... ..	0	11	1	2½
Seconds ...	0	5	0	9					

Ostrich Feathers.—All superior qualities rule very firm. Inferior Feathers are less in demand, and for this the market must be reported as being weaker. Ostrich feather farmers, who are in any way progressive, strive to only keep birds from which good quality feathers may be expected. The more this policy becomes general, the better for all concerned. It is sure to strengthen the market all round. Inferior qualities continue to prove a drag in the market.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes ...	19	0	0	32	0	0	Floss ...	0	7	6	1	10	0
First, ordinary to							Long Drabs ...	2	5	0	4	0	0
Seconds ...	11	0	0	14	0	0	Medium Drabs ...	0	15	0	1	10	0
Seconds ...	7	10	0	8	10	0	Short to Medium ...	0	5	0	0	15	0
Thirds... ..	3	0	0	5	10	0	Floss ...	0	5	0	1	5	0
Femina Super ...	9	10	0	13	0	0	White Tails ...	1	2	6	2	0	0
Do., Seconds to							Coloured Tails ...	0	12	6	1	5	0
Firsts ...	4	10	0	10	10	0	Chicks... ..	0	1	0	0	2	6
Byocks (Fancy) ...	4	0	0	8	0	0	Spadonas ...	0	10	0	1	10	0
Long Blacks ...	2	15	0	6	10	0	Inferior Black and						
Medium Blacks ...	1	10	0	3	10	0	Drabs, short to						
Short to Medium ...	0	10	0	1	5	0	long ...	0	0	6	1	10	0

Hides and Skins.—Since my last report no material changes in the market have taken place. Prices continue very firm, and I strongly advise to hurry on consignments from the country, the market being altogether in favour of the sellers.

	s.	d.	s.	d.		s.	d.	s.	d.
Long woolled Skins ...	0	5½	0	6½	Goat, heavy to light ...	0	10½	1	2½
Short... ..	0	4	0	4	Sundried	0	0	0	6
Shorn	0	0	0	3	Angoras	0	4	0	6½
Bastards	0	3½	0	4	Sundried Hides ...	0	6½	0	7½
Cape Skins, each ...	2	2	2	8	Salted	0	5½	0	7
Do., cut, each ...	0	0	1	1	Wet... ..	0	3½	0	4½

PORT ELIZABETH.

Messrs. John Daverin & Co. report under date February 25th, 1910 as follows :—

Ostrich Feathers.—The market was moderately supplied this week with the usual average assortment. On Monday prices generally ruled very firm, but on the two following days there was a weaker tone, and prices ruled irregular, especially for ordinary and common sorts, good qualities still bringing extreme prices. The total quantity sold amounted to £11,800 1s. 2d., and weighed 4,517 lbs. 8½ ozs. Stocks and new arrivals are small.

We quote the following as current prices of :—

PRIMES :	£	s.	d.	£	s.	d.	TAILS (continued) :	£	s.	d.	£	s.	d.		
Extra Super ...	35	0	0	to	52	16	0	Female, dark, good							
WHITES :							average ...	0	6	6	to	0	12	6	
Good to Super ...	12	10	0	„	30	0	0	„ dark, short							
Good Broken ...	8	10	0	„	15	0	0	and narrow...	0	0	6	„	0	2	6
Narrow ...	5	0	0	„	7	10	0	BLACKS :							
Thirds ...	2	0	0	„	4	15	0	Long (special) ...	7	0	0	„	12	10	0
FEMINAS :							„ good ...	5	5	0	„	6	10	0	
Super ...	15	0	0	„	25	0	0	„ fair ...	3	15	0	„	4	10	0
Good to Super ...	8	10	0	„	14	0	0	„ drabby ...	2	0	0	„	3	10	0
Good Broken ...	5	10	0	„	12	10	0	Medium ...	1	5	0	„	3	15	0
Fair Average ...	4	5	0	„	6	10	0	Short ...	0	12	6	„	1	2	6
Narrow ...	1	10	0	„	3	5	0	Wiry ...	0	0	6	„	0	2	6
Thirds ...	1	5	0	„	2	0	0	Floss, long ...	0	12	6	„	1	2	6
Greys ...	3	5	0	„	10	0	0	„ short ...	0	5	0	„	0	9	0
FANCIES :							DRABS :								
Super ...	9	0	0	„	12	10	0	Long (special) ...	4	10	0	„	7	0	0
Good ...	6	15	0	„	8	10	0	„ good ...	2	15	0	„	3	15	0
Poor and Narrow ...	3	10	0	„	5	10	0	„ fair ...	1	5	0	„	1	15	0
TAILS :							Medium ...	0	12	6	„	1	10	0	
Male, good big bold	2	5	0	„	3	10	0	Short ...	0	2	6	„	0	9	0
„ good average	1	0	0	„	1	15	0	Wiry ...	0	0	3	„	0	1	0
„ Short & Narrow	0	7	6	„	0	15	0	Floss, long ...	0	12	6	„	1	2	6
Female, light, good,							„ short ...	0	5	0	„	0	7	6	
big, bold ...	2	0	0	„	3	10	0	SPADONAS :							
„ light, good							Light (special) ...	5	0	0	„	7	0	0	
average ...	1	0	0	„	1	15	0	„ fair to good...	1	5	0	„	4	5	0
„ light, short							„ narrow ...	0	7	6	„	0	17	6	
and narrow....	0	3	6	„	0	10	0	Dark ...	0	10	0	„	3	0	0
„ dark, good,							CHICKS ...	0	0	3	„	0	7	6	
big, bold ...	0	15	0	„	1	10	0								

The following may be quoted as the approximate current values of unsorted parcels per line :—

	Whites.						Feminas.					
Superior pluckings* ...	£10	0	0	to	£15	0	£7	10	0	to	£10	0
Good Average lots ...	7	12	0	to	9	10	5	5	0	to	6	15
Poor Average lots ...	4	10	0	to	6	5	2	0	0	to	4	5
Common lots, stalky, narrow and discoloured ...	2	0	0	to	4	0	0	15	0	to	1	5
	Tails.			Blacks.			Drabs.			Spadonas.		
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Good ...	11	0	to	16	0	20	6	to	17	6	30	0
Average ...	7	6	to	10	0	12	6	to	11	6	12	6
Poor ...	3	6	to	6	6	7	6	to	7	6	2	6

It will be understood that for special lots these quotations may be exceeded.

Wool.—This market continues very firm, but owing to small stocks and arrivals, the amount of business done in the open market has been very moderate. At the Catalogue Sale on Wednesday 2,150 bales were offered, of which 1,100 bales were sold. Competition was active for all light-conditioned Grease and Snow Whites at full current prices, but Heavy and Wasty Grease was neglected. On the Public Market on Thursday the usual oddments and C. and C. were offered, prices showing no change.

We quote the following as current prices of :—

Snowwhite, Extra Superior ... 20½d to 21½d	Grease, Coarse and Coloured ... 1½d to 4d
Do. Superior ... 18d „ 19½d	Scoured do. do. ... 1½d „ 8½d
Do. Good to Superior... 17d „ 17½d	Basuto Grease, short ... 6½d „ 6¾d
Do. Inferior Faulty ... 14d „ 15d	O.R.C. Grassveld Grease, long & well-conditioned (special clips) 7½d „ 8d
Grease, Super Long, well-conditioned, Grassveld grown (special clips) ... 8½d „ 10d	Do. do. do. ... 6½d „ 7d
Do. do. do. ... 7½d „ 8½d	Do. do. medium grown, light, with little fault ... 6d „ 6½d
Do. do. Karoo grown (special clips) 7¾d „ 8½d	Do. do. short, faulty & wasty 4½d „ 5½d
Do. do. do. ... 6¾d „ 7d	Do. do. Karoo grown, long & well-conditioned ... 6½d „ 7½d
Do. do. Mixed Veldt... 7d „ 7½d	Do. do. medium grown, light with little fault ... 6d „ 6½d
Do. Light, faultless, medium Grassveldt grown ... 6½d „ 7½d	Do. do. short, faulty and wasty... 4½d „ 5½d
Do. do. Karoo grown 6¾d „ 7½d	
Do. do. short, do. 6d „ 6½d	

Mohair.—This market remains steady, but the amount of business doing is very limited, our sales of about 100 bales Summer Firsts being the only transactions of any importance during the week. On the Public Market on Tuesday a limited quantity was offered, chiefly made up of mixed Free State parcels, prices showing little change from those paid last week.

We quote the following as current prices of :—

Super Kids None offering	Mixed O.R.C. Hair (average) 8½d to 10½d
Ordinary Kids and Stained ... do.	Do. very mixed ... 7d „ 8d
Superior Firsts, special clips ... 12½d to 12½d	Seconds and Grey ... 5d „ 7½d
Ordinary Firsts... .. 11½d „ 12d	Thirds ... 4½d „ 4¾d
Short Firsts and Stained ... 10d „ 10½d	Winter Kids, special clips ... 16d „ 16½d
Superfine Long Blue O.R.C. Hair 10½d „ 13d	Do. good ordinary ... 14d „ 15d
	Winter Hair ... 9½d „ 10d
	Basuto Hair ... 8½d „ 10d

Skins.—We sold this week. Sheepskins, in bundles, at 5½d., and Pelts at 4½d. per lb.; Capes, 25d.; damaged, 7½d. each; Goatskins, 13½d.; damaged, 7d. per lb.; and Heavy Goatskins, 8½d.; Angoras, 7½d.; Shorn, 5½d.; damaged, 5¾d. per lb.; Johannesburg Sheep, 5½d.; Goat, 9d.; Angoras, 6½d.; Springbok, 8½d. each.

Hides.—Sundried, 9¾d.; damaged, 8¾d.; Salted, 8¾d.; damaged 7¾d.; Thirds, 5½d.

Horns.—3½d. each all round.

EAST LONDON.

Messrs. Malcomess & Co., Ltd., write under date 26th February, 1910, as follows :—

Wool.—The last of the Wool Fairs for the past season was held on 31st ult., groups 4 and 5, the former comprising Burgersdorp, Stormberg, Molteno, Tarka, Aliwal North and Southern O.R.C. (south of Bloemfontein and Thaba Nchu), whilst Group 5 consisted of Transvaal, Northern and Middle O.R.C. (including Bloemfontein and Thaba Nchu). In the former the result was as follows :—1st prize, P. J. de Wet, Tarkastad; 2nd prize, Colton Bros., O.R.C.; 3rd prize, D. & D. H. Fraser, Ltd., Cavollo. The wools were all of good length, quality and style, but all were rather tender in staple. In Group 5 there was only one exhibit, viz., Jay & Walton, Winburg, who exhibited a fine clip, well got up, and in every way worthy of a first prize. Competition for these clips was very keen, and the skirted clips fetched from 8d. to 9½d., according to quality and condition.

The London Sales have closed without further change in prices, with 4,500 bales Australian and 500 bales Cape Wools held over for next Sales, which is barely 3 per cent. of the total offerings.

During the month our local market has been fairly active; prices have ruled firmly, and a fairly good clearance has been effected. On 5th inst., 3,200 bales were offered and 2,200 sold; on 12th inst., 3,800 bales were offered and 2,000 sold; on 19th inst., 2,100 bales were offered and 1,000 sold; on 23rd inst., 2,100 bales were offered and 1,100 sold; and in addition to this another 3,500 bales were sold privately, bringing the total of transactions up to about 10,000 bales. The Long Wool season is now drawing to a close, there being only a few more wools to expect from the O.R.C. and Barkly districts. Stocks in town total about 5,000 bales, mostly very heavy wasty wools. Reports from the European markets do not anticipate any change in the immediate future. Prices are now very high, and we are inclined to think that any change that takes place during the next two or three months will be against the producer.

Super long light Kaffrarian Farmers and similar well-conditioned Wools	9½d to 11d	Good long well-conditioned Grass Veldt	6d to 7½d
Super short ditto	7½d „ 8½d	Good short ditto ditto	5d „ 6½d
Long well-skirted Farmers	7½d „ 9½d	Heavy, faulty wasty, long Grease	5½d „ 6½d
Super short ditto ditto	6½d „ 7½d	Heavy, faulty wasty Short Grease	5d „ 5½d
		Coarse and Coloured Grease	2½d „ 5d

Mohair.—Very little is doing in this market, stocks being very low. We quote :—Superior Long Blue, 12½d.; Average Long Blue, kempy, 10½d. to 11d.; Average to Superior Basuto Mohair, 10d. to 10½d.; Seconds, 5d. to 6½d.; Dockings and Grey, 3½d. to 5d..

Sundry Produce.—We quote :—Sundried Hides, 9½d.; Dry-salted Hides, 8½d.; Goatskins, 12½d.; Angoras, 8½d.; Damages, 7d. each; Sheepskins, 5½d.; Pelts and Coarse and Coloured, 4½d.; Transkeian and King William's Town lots, 4d. to 4½d.; Horns, 2d. to 4d. each, according to size and quality.

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SPECIALS ONLY.—Choice pairs, £50 to £100 per pair.—F. W. BAKER, Laughing Waters, Willowmore.

OSTRICHES.—Young and old.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co., Ltd., Porterville Road.

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BERKSHIRE BOARS.—Pure bred. Ages two to fifteen months. Bred by Charles Leonard, Esq. on his well known "Gloria" Estate.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co., Ltd., Porterville Road.

PURE BRED BERKSHIRE PIGS.—Prize Winning Stock. Boars and Sows, £3 each. Also Buff Orpington and White Leghorn Poultry.—Apply MANAGER, Maitland River Farm, Green Bushes Hotel, Port Elizabeth.

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FRIESLAND BULLS. bred from the best IMPORTED stock, from a few weeks to fifteen months old.—For further particulars, apply to Mr. R. S. DE VILLIERS, The Imperial Cold Storage and Supply Co. Ltd., Porterville Road.

ENGLISH BREEDERS.—WILLIAM COOPER AND NEPHEWS, "Cooper Dip" Works, Berkhamsted, England. Shorthorn, Hereford and Polled Cattle; Shropshire Sheep; Berkshire and Large Black Pigs. 54 First Prizes at British Shows last year. Every facility given to Colonial Buyers. Send to W. C. & N. P.O. Box 305, East London, Cape Colony, for "Pedigree Stock and its Export," gratis and post free.

GENERAL.

PASPALUM GRASS PLANTS.—Strong roots per Rail or smaller plants per Post to any address. See larger advertisement, page ix. this Journal.—A. C. BULLER, Dwarsriviershoek, Stellenbosch.

PHALARIS COMMUTATA.—This splendid new perennial pasture and fodder grass growing over six feet high giving grand feed when lucerne is dormant. Seed, 2/- per oz., 20/- per lb. Plants, 3/- per 100, 20/- per 1,000 in lots of 20,000 for £12.—From F. W. STRANGMAN, Erin Vale, Somerset West.

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MRS. M. F. DOTT, Breeder and Exhibitor, of high-class Exhibition Poultry. Over 300 Prizes since 1907. Black, White and Silver Wyandottes, Buff Orpingtons and Black Minorcas Cockerels and Pullets from 10s. each. Newly hatched Chicks from 2s. per dozen. If you wish to improve the table and laying qualities of your Poultry, or breed first-class Exhibition Stock, drop me a post card. Correspondence cordially invited.—Address, Kenilworth, Kimberley.

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BUFF ORPINGTONS.—THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE. A 1 TABLE BIRDS. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities. Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled Colonial strain of 10 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Address: A. C. BULLER, Dwarsriviershoek, Stellenbosch.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

*Colonial, 24 years of age, desires employment as Manager or Assistant on farm. Has had about three years' experience in mixed farming, cattle, horses, sheep, grain, &c. Thorough knowledge of dairy work, including hand-rearing of calves. Good references. Free April.—"G." Monorgan, Newlands, Cape.

*Wanted positions by two Canadian Butter and Cheesemakers; have had eight and ten years' experience. Graduates of Kingston Dairy School, Kingston, Ont., Canada; also University State Dairy of California, U.S.A. At present holding Manager's position in creamery. Can furnish good references from past and present employers. Would be willing of coming to South Africa if similar position would be offered.—Address, Allen G. Roe, Gustine, California, U.S.A.

*Healthy young man (South African) 18 years old wishes to take to farming. Would like to hear of good opening, has had over one year experience on mixed farm. Apply B. Desvages (Chemist) 141, Loop Street, Cape Town.

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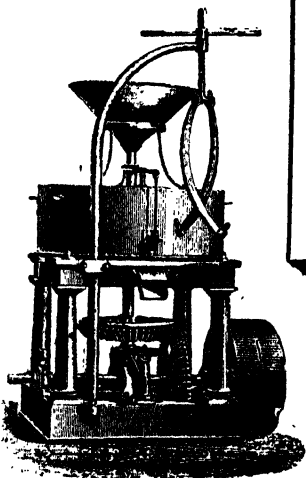


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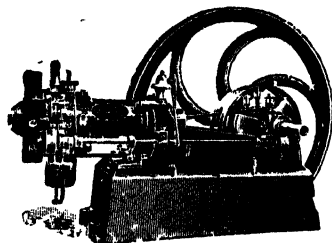
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January 29th, 1910.

Messrs. GEO. FINDLAY & CO.,
Engineers, Cape Town.

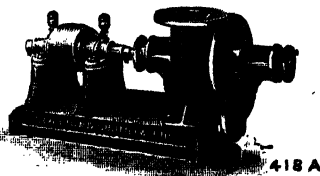
DEAR SIRS,

We have much pleasure in stating that the "Crossley's Oil Engine" and "Pearn Treble Ram Pump" which were supplied to us by your firm were tested yesterday by Mr. Stainthorpe, the engineer for the works and representing the Government, and the whole plant did the work required of it most satisfactorily. The Engine was run at 263 revolutions per minute and the Pump at 75 revolutions per minute and on a 5 hours test they pumped into the reservoir more than the specified quantity, which is 6,000 gallons per hour. The Engineer and Village Management Board and ourselves are well satisfied with the result of the test.

We would take this opportunity to thank you for the care and promptitude with which you supplied this machinery to us and owing to the secure way in which it was packed we received it without any breakage although it was brought over 100 miles on an Ox Wagon over very rough roads.

Yours faithfully,

(Sgd.) HOPE & BELL,
Contractors.



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LARGEST IMPORTERS OF ENGINEERING SUNDRIES.

GEO. FINDLAY & CO., CAPE TOWN.

THE Agricultural Journal OF THE CAPE OF GOOD HOPE.

No. 4.

APRIL, 1910.

VOL. XXXVI.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

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Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Cape Town.

Telegraphic Address: "Bulletin," Cape Town.

CONTENTS.

PAGE

NOTES	392
East Coast Fever—Mexican Poppy—Agricultural Instruction at St. Andrew's Dry Land Farming in the United States—S.A. Dairying Congress—Seed Testing Charges—Bee Doings—Is South Africa Drying up?—The Story of "Federation"—Wheat—Raising Plants under Glass Bells—Another Nitrogenous Fertilizer—Humane Slaughtering of Animals—Starke & Co's Seed Catalogue.	
THE KED OR SHEEP LOUSE (Illustrated)	398
LIVE STOCK REGISTER AND WAGES BOOK	403
IS SOUTH AFRICA DRYING UP?	405
GIANT TWIG GALL—OF WILLOW, POPLAR, PEACH, APPLE AND OTHER TREES (Illustrated)	408
THE INFLUENCE OF FORESTS ON WATER SUPPLY	412
THE CIRCULAR DIPPING TANK, WITHOUT CENTRE PILLAR, AND ITS ADVANTAGES OVER OTHER TANKS (Illustrated)	418
REINFORCED CONCRETE FENCE POSTS	420
AGRICULTURAL SHOW SEASON, 1910—SOME CHAMPIONS (Illustrated.)	
AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS (continued)—(Illustrated) ..	423
FIELD TRIALS OF LAND-LEVEL-TAKING INSTRUMENTS AT MIDDELBURG, C.C. (Illustrated)	433
MILK RECORD	437
CO-OPERATIVE EXPERIMENTS—MAIZE	438
RETURN OF OUTBREAKS OF CONTAGIOUS DISEASES	464
THE DANISH SYSTEM OF CATTLE BREEDING	465
ARTESIAN WELL BORING MACHINERY	470
LICKS AND STOCK DISEASES	475
FRUIT EXPORT FOR FEBRUARY, 1910	478
INDUSTRIAL ALCOHOL AND FIBRE FROM LEAVES AND STEMS OF PLANTS	479
CORRESPONDENCE	485
Home-made Soap—Hand-Power Threshing Machine—The Clarification of Honey—The Eradication of Scab—Another Prickly Pear Exterminator—Sickness in Ostrich Chicks—The Poison Dispute—The Plague of small Birds.	
NOTES ON THE WEATHER OF FEBRUARY, 1910	493
RAINFALL	498
PRODUCE MARKERS	503

B

NOTES.

East Coast Fever.

On the 31st ultimo a case of East Coast Fever was diagnosed among some cattle grazing on the Umzimkulu Village Commonage. The only infected animal, a cow the property of the local constable, had been three years in the village, so it is more than difficult to conjecture how the infection was contracted. The case was discovered by Veterinary Surgeon Spreull. On the matter being reported the affected animal was forthwith destroyed, as well as 303 animals, which were treated as in-contacts. The infected area was promptly quarantined, also the major portion of the Umzimkulu district abutting on the Natal border, and extending from Riverside to Harding Gate, which is fenced and guarded. No movement of horned cattle is permitted from or into, or from any one farm, native location, forest reserve, outspan, or commonage, to any other such place within the quarantined area. The Government, in a word, is putting forward every endeavour to arrest the spread of the disease, and although it has crossed our borders, there is still hope that it may be brought under control.

Mexican Poppy.

Considerable dispute having arisen at the recent Bond Congress at Beaufort West in regard to the correct name of a certain proclaimed noxious weed, known by some persons as the Mexican Poppy and by others as the Scotch Thistle, we are desirous to state that the plant in question is none other than the Mexican Poppy (*Argemone Mexicana*), and that the true Scotch Thistle does not exist as a bad weed in this country. The Poppy is a robust plant, two to four feet in height, with grey-green prickly leaves and cream-coloured flowers composed of four triangular petals similar to those of the common poppy. This weed is at present proclaimed noxious in the following districts:—Wodehouse, Graaff-Reinet, Cathcart, Stockenström, Aberdeen, Somerset East, Murraysburg, Vryburg, Barkly East, Tarka, Willowmore, Prince Albert, Aliwal North, Mafeking, Molteno, Steytlerville, King William's Town, Komgha, Cradock, the Transkeian Territories, and Pondoand.

Agricultural Instruction at St. Andrew's.

The Principal of St. Andrew's College, Grahamstown, reporting on the recently established Agricultural Section there, says fourteen boys have come under instruction in this Department. Two are rather backward: one is attempting the full course; the other cannot yet do so. As so many branches call for instruction, the attention of the class has been confined to certain subjects, leaving others to be taken on afterwards. Lectures and practical work have so far as possible been dovetailed, so that theoretical teaching might have a direct bearing on the current occupation of the students. The instruction given has been as follows:—

(a) *Agriculture*.—Lecturer: Mr. W. A. Robinson, B.A., late Scholar of Royal Agricultural Society, England. Three classes weekly. Practical work carried on in the early morning, and also on one afternoon each week.

It consisted of ploughing, harrowing, and planting, under the direction of Mr. Cockroft, jun.

(b) *Horticulture*.—One afternoon (three hours) was spent each week at Mr. Gowie's Nurseries, under the direction of Mr. William Gowie. Class teaching is also given in this subject.

(c) *Elementary Land Surveying, Mensuration, and Principles of Irrigation*.—One lesson weekly. Lecturer: Mr. K. W. J. Laurie, B.A., late Surveyor in the Transvaal.

(d) *Chemistry*.—Four lessons weekly. Lecturer: Mr. J. I. Fraser, M.A., Science Master.

(e) *Horse Management and Breeding*.—Lecturer: Mr. Du Plessis. One lecture and demonstration weekly.

(f) *Farriery*.—Class teaching and individual instruction at Mr. Sampson's Farriery.

(g) *Carpentry*.—Class teaching and individual instruction. Instructor: Mr. Webber.

(h) *Book-keeping*.—Lecturer: Rev. W. G. Dowsley, B.A. Evening classes in Farm Book-keeping.

Arrangements have been made for further lectures and demonstrations, as follows:—

(a) *Sheep and Wool*.—Lecturers: Mr. T. T. Hoole, jun., Medallist, Hawksworth Agricultural College, N.S.W., and Mr. McKee, Government Wool Expert.

(b) *Ostriches*.—Lecturers: Dr. Duerden and Mr. G. White. Lectures will be supplemented by practical demonstrations.

(c) *Entomology*.—Lecturer: Mr. C. W. Mally, M.Sc., Eastern Province Entomologist. (Mr. Mally has already given one lecture.)

(d) *Horticulture*.—Lecturer: Mr. Pillans.

(e) *Dairy Management*.—It is hoped to arrange a series of demonstrations.

A small library of Agricultural Works has been collected, and the Agricultural Department has kindly presented a large number of pamphlets and copies of the *Agricultural Journal*. A collection of specimens of African, Australian, and New Zealand wool has also been presented by Mr. Wm. McKee. The lectures by the Government officers mentioned above are given by private arrangement, with the consent of the Agricultural Department.

Dry Land Farming in the United States.

The Chief of the Bureau of Plant Industry of the United States Department of Agriculture (Dr. B. T. Galloway) in his report for 1909 gives some interesting details with regard to the investigations carried on by the twenty Experiment Stations in the arid and semi-arid sections of the West and South-west—in other words, the dry-land farming regions. This report is of great value, as it emanates from an unbiassed and wholly disinterested source. Dr. Galloway shows that much valuable data is being accumulated, upon which reliable conclusions can be based, not the least important fact demonstrated being the danger of attempting to draw conclusions from observations, experience, or experiments carried on in a single locality. Local or seasonable weather and soil conditions, he states, are often the controlling factors in determining the success or failure of methods of tillage and crop rotation,

Moisture Conservation not the only Problem.—That phenomenal yields (continues Dr. Galloway) are sometimes obtained from certain tillage methods when soil and climatic conditions are favourable in the arid and semi-arid districts has been demonstrated by interested parties to an extent that has brought profits to the exploiters, but often ruin to the credulous home-seeker. The fact that these methods often fail to produce good crops has, however, been carefully withheld from the public. Until these investigations were undertaken by the Office of Dry-Land Agriculture no adequate efforts had been made to gather data showing the percentage of failures of these methods and the cause of these failures. Hail, high winds, frosts, and attacks of insects and disease are all factors of such importance in many parts of the Great Plains that they cannot be safely neglected in a study of the agricultural problems of this area. There are undoubtedly localities where these factors are so important that it is very doubtful whether it is safe to recommend even the most approved methods of tillage for the conservation of moisture. These methods necessarily involve considerable additional expense without any additional safeguard against any of the dangers which threaten the crop, except that of drought. All this additional expense increases the risk that the farmer takes, and if he fails his loss is proportionately greater than it would have been had he adopted a less expensive system.

S.A. Dairying Congress.

The South African Dairying and Agricultural Organisation Conference has, we learn from Mr. R. J. Moore, the hon. secretary, been fixed to open in Bloemfontein on April 13. The agenda is to include the following subjects:—

1. Necessity for legislation on production within the country, and in view of possible export trade, necessity for standardisation and grading of dairy produce under Government auspices.
2. Railway facilities for collection and distribution of dairy produce throughout South Africa. Need for improvement and how to be effected. Cold storage and transit generally.
3. Fixing of legal standards for milk and cream as supplied to Creameries, with a view to bringing unclean and undesirable produce supplied to Creameries under the control or regulations of the Food and Drugs Act, and prohibit the manufacture for sale of any article of food manufactured from unsanitary milk or cream.
4. Definition of unsanitary milk or cream.
5. The amalgamation of existing Creamery interests for purposes of sale of their products and control of supplies on South African markets, and to consider a scheme to be submitted by the Secretary, including provision for co-operative purchase of standard requirements.
6. The relation and duties of Government towards the industry as a whole.
7. The improvement of dairy herds and formation of Cow Testing Associations under the direction of existing Creameries. (Paper to be read.)
8. Provision of training facilities for Managers (importance of). To draft a standard syllabus, with a view to influencing Government action.
9. Organisation of a South African Creamery Managers' and Dairymen's Association.
10. Inspection of Creameries—and regulations for—under Government control.
11. Relations between individual Creameries in respect of supplies and general organisation.
12. Notes on a trip to Great Britain and Denmark by the Secretary, with a comparison of South African conditions.

13. Advertising South African dairy products.

14. The Cheese Industry, its prospects and importance. Necessity for Government aid in respect of educational facilities, cool curing rooms, experimental research, etc.

Seed Testing Charges.

The following tariff of charges for the testing of seeds submitted to the Agricultural Department has been framed, viz.:—

	s.	d.
Complete Analysis (pure seed, other seed, rubbish, germination)	5	0
Analysis for Purity	3	0
Germination test only	2	6

Samples should be submitted direct to the Government Agriculturist, Cape Town, and must in every case be accompanied by the prescribed fees for the analysis. Remittances should be made by Stamps or Postal Notes or by Post Office Orders in favour of the Under Secretary for Agriculture, Cape Town.

Bee Doings.

A Transkei correspondent writes:—On brushing the bees off frames of honey for extracting I noticed the other day that in one hive the young bees that could not find the entrance quickly deliberately stung themselves—in fact, committed suicide. It turned a bit cold as I was working with the hive.

I was contracting a hive with two brood bodies, and after shaking the bees off the frames in front of the entrance to the hive, a small cluster of bees formed on the grass in front of the hive. Presently they opened out, and I saw about four workers had hold of the queen by her wings, and they did their best to fly with her to the hive entrance. They got her on to the alighting board, and then started to drag her up to the entrance.

Is South Africa Drying Up?

With reference to the question raised under the above heading by Mr. F. H. Barber, we have received a copy of the "Northern News" (Vryburg), in which a correspondent gives a denial to Mr. Barber's conclusions. He quotes Mr. Barber's statement that: "All along the banks of the Mashowing were thousands of magnificent 'Kameel' thorn trees, all dead, died probably when the river ceased to flow, a great while ago, but preserved by the extense dryness of the climate, like the ancient monuments of Egypt." He then continues: This is said by the writer of the article to have been observed by him in 1895, fifteen years ago. Evidently the days of miracles are not past, for as the kameel is a very slow growing tree the thousands of magnificent Kameel trees along the Mashowing that are in luxuriant foliage to-day must be the same trees that Mr. Barber saw in 1895. The rainfall at Masilibitsani last year was over 22 inches, and I am certain that the condition of the veld would compare with that of Mr. Barber, Greenhills, Grahamstown, the writer of the article in question.

This all goes to show once more how futile are the speculations as to the drying up of this country. The rainfall may vary in places, and local changes take place which are largely the result of careless occupation; but it does not necessarily follow that the conditions of the country as a whole

are any drier than they ever were. Instead of prophesying disaster, what we need in South Africa is the education of the people on the land to a recognition of the fact that disaster (of this kind, at least) is preventable. In this issue Mr. E. R. Bradfield returns to this subject with commendable persistence, and too much stress cannot be laid upon its vital necessity. As a matter of fact, what South Africa needs more than anything else at the present moment is a broad national policy of reclamation. Such a policy would keep us all occupied for the next fifty years, prepare the land for settlement, and prove the most profitable investment ever undertaken.

The Story of " Federation " Wheat.

The breeding of wheat to suit South African conditions has but just begun. In Australia it was taken in hand years ago, and the story of one particular variety, which has come very prominently to the front lately—the Federation Wheat—is so encouraging to us that it should be widely known. Federation wheat, which has proved so successful during the present year throughout the Australian States—South Australia and Victoria especially—is a variety that was artificially bred by Mr. Farrer (now deceased), the late wheat experimentalist to the New South Wales Department of Agriculture, about twelve years ago. It was first widely tested in 1903-4, when the plots on the Government Farm at Wagga yielded 35½ bushels to the acre. In the following year these results were published by the Victorian Department, and the wheat was introduced into the experimental plots of the State. So rapid has been the advance of the new variety in the estimation of farmers that probably one-fourth of all the wheat in Victoria this year is Federation. As the yield is at least three or four bushels to the acre above that of all other varieties, the benefit in that State alone during the year from the work of the late Mr. Farrer may be estimated at 1,500,000 bushels of wheat, representing a cash value to the farmer of £250,000—a remarkable result for a scientific man to accomplish in one season. That is the epitome given by the Victorian Director of Agriculture (Dr. Cherry), who says:—"The question of whether the present wheat harvest will realise the official forecast of 28,500,000 bushels depends to a large extent on the way that Federation may have stood the test of an unfavourable winter's growth. The variety has proved its ability to withstand drought, but the present year is the first which has offered the conditions for testing whether it can successfully pass through the test of an abnormally wet winter. Up to the present the returns received are all in its favour. Returns of 20 bushels to the acre in the Mallee and 35 bushels in the best parts of the Wimmera are being recorded."

Raising Plants under Glass Bells.

There is gradually being introduced into England from France a system of rapid development in plants, which is doing good work in the latter country. It consists of a glass cover, the general size of which is 17 inches in diameter at the base and 15 inches high. Each one weighs about 5 lbs., and in some designs is provided with a knob at its top for lifting purposes. These bell glasses, as they might well be called, enable gardeners to make large profits, since fruit and flowers can be produced out of season at but little cost. Some of the advantages are stated to be that no masonry or frames are required to protect the flowers from heat or cold; there is no waste of ground by walls; the "cloches" can be raised to allow the plants to grow tall; fresh air can be admitted at any moment, or heat retained,

when necessary; each "cloche" is manageable by a child, and last, but not least, they render the article free from dust, which frequently is so disagreeable about some ground fruits. Three sticks are driven into the ground, and the bottom edge of the bell glass rests upon steps formed therein. The steps in the sticks enable the height of the glass to be raised as the plant grows.

Another Nitrogenous Fertilizer.

Yet another system of utilising atmospheric nitrogen for fertilizing purposes is described in European exchanges. This system has been invented by a M. Serpek in France. The material is described as a nitride of aluminium—that is, a compound of nitrogen and aluminium. Carbide of aluminium is first prepared in the form of yellow crystals by heating aluminium and carbon together in an electric furnace. Like other carbides, it has the property of fixing the nitrogen of the air, and by this means the nitride of aluminium is formed. In practice the process is worked in this way. The aluminium carbide being formed in the furnace is immediately mixed with more aluminium. This is then treated with the gas from the producer, which contains 77 per cent. of nitrogen, the rest being chiefly carbon monoxide. The product contains 20 to 24 per cent. of nitrogen, and can be used at once as a fertilizer. Acted upon by oxygen and moisture it gives off ammonia, which is converted into nitrates.

Humane Slaughtering of Animals.

The British Local Government Board have issued to local authorities a circular drawing attention to certain recommendations by a Government committee with a view to securing the humane slaughtering of animals. The committee recommend that all animals should be stunned or rendered unconscious before blood is drawn. It is also observed that:—"The animals awaiting slaughter should be spared as far as possible from any contact with the sights or smells of the slaughter house itself. There is no point which the committee have more carefully investigated than the question as to whether animals do or do not suffer fear from this contact and the evidence of those best qualified to judge is so conflicting that no absolute verdict can be given. As an animal cannot speak, it is impossible to accurately determine to what extent it does not suffer from fear: but there is no doubt that cattle especially frequently show great reluctance to entering the slaughter-chamber, and can only be dragged in by the employment of considerable force. The presumption is that what they chiefly object to is the smell of blood, but whether this can be proved or not, it is obviously undesirable from a purely business standpoint to run any risk, as it appears to be an established fact that the flesh of an animal killed whilst in a state of fear or excitement loses some of its palatable and marketable qualities. Apart from this, the question is of such vital importance from the standpoint of humanity that it seems clear that the animal should be given the full benefit of the doubt."

Starke & Co.'s Seed Catalogue.

We have received a copy of Messrs. C. Starke and Co.'s seed catalogue for 1910, and have pleasure in recommending it to our readers. In addition to the usual garden and vegetable lists, there are very complete lists of cereals, grasses, and agricultural seeds, specially selected for this country. Messrs. Starke and Co., whose postal address is Mowbray, C.C., will forward copies post free on request.

THE KED, OR SHEEP LOUSE.

By A. G. DAVISON, Chief Inspector of Sheep.

In the issue of the *Agricultural Journal* for November, 1908, I contributed a few notes, descriptive of the life history of the Ked, or Sheep Louse (*Melophagus ovinus*), with the object of showing how sheep farmers should deal with this additional plague to the wool industry. Unfortunately, there are many flock masters in the Colony who believe that the Ked is a valuable ally, or friend in disguise, in as far as the eradication of scab is concerned, and such owners of sheep having no hesitation in acting up to this persuasion, are more inclined to cultivate than destroy the parasite. It is freely admitted by one and all that the

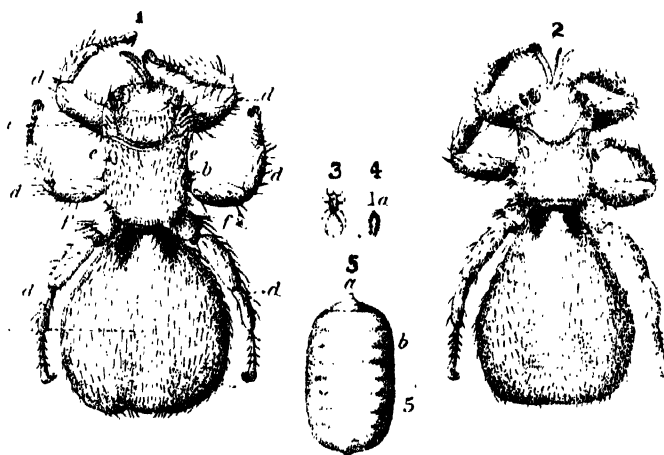


Fig. 1.—Male, dorsal view, x 8; *a*, head; *b*, thorax; *c*, abdomen; *d*, limbs; *e*, oval bristle-covered disks, which correspond to the points of attachment of wings in other flies; *f*, rudimentary halteres or poisers.

Fig. 2.—Female, dorsal view, x 8.

Fig. 3.—Female sheep tick; natural size.

Fig. 4.—Larva case, natural size.

Fig. 5.—Larva case, x 8; *a*, cephalic end; *b*, two rows each of seven shallow indentations.

Ked causes intense irritation to the animals which it infests, in fact no farmer can be oblivious to the irritative effects of the pest, for the torn and broken places of the sheep alone speak volumes in this respect.

Notwithstanding this admitted disadvantage, many now suppose that the damage caused to the wool and condition of the sheep, is more than counterbalanced by the idea that the Keds destroy the mites which cause scab on the sheep and thus materially assist in keeping the flocks free from scab.

In some parts of the Colony, the reputation gained by the Ked as a destroyer of scab, is almost incredible, for farmers have been known to carry the parasite for long distances, and from farm to farm, in order that they may be placed on sheep which have hitherto been free from the pest. Even when flocks infested with the Ked are being dipped, it is now customary in some parts to select a few sheep, and refrain from dipping these, in order that the Keds may not be wholly destroyed, but may again propagate their species. To such extremes has this practice now developed, and so difficult has it proved to convince certain farmers that they are adopting a wrong course in introducing an additional plague among their flocks, that it was deemed advisable to carry out a practical demonstration at some central place, with the object of proving that the Ked, far from being an ally to the farmer in the fight against scab, is in reality as irritating to the sheep, and almost as destructive to the fleece as scab itself.

Cradock, having been selected as the place at which the test should be carried out, two sheep, one free from scab but infested with Keds, and the other infested with scab, but free from Keds, were selected by my assistant, Mr. S. Keightley and the local sheep inspector Mr. F. J. de Wet. The experiment was commenced on 29 December last, in the presence of several influential gentlemen, by placing a certain number of scab mites on the clean sheep, and some fifty Keds in the infested animal. The result of the test will appear in my Annual Report, but it may be as well to quote the remarks made by my assistant Keightley and inspector De Wet on the subject, so that those farmers who look upon the Ked as a valuable ally, may see how they have been deceived and adopt more efficacious measures for the cleansing of their sheep as well as take other means to guard against the reinfection of their flocks.

Mr. Keightley on 5th February last writes as follows:

"A belief has been gradually gaining ground in parts of the areas under my charge that the sheep louse known as "Ked" subsists on, when obtainable, and destroys the scab mite, and will in consequence clean sheep of the disease of scab. As a result a sprinkling of farmers have wilfully infected their sheep with this additional plague. Others have again been loth to dip their stocks to the destruction of the Ked, thinking thereby that they are killing an enemy to scab. These views, and the consequent position taken up by these owners have proved detrimental to the operation of the Scab Acts in my area. In consideration of the foregoing circumstances, I deemed it advisable to carry out a practical demonstration to show all persons interested that the Ked, far from being a friend to the farmer and his sheep, is simply when present, an additional pest to be reckoned with, and that it nourishes itself from the sheep, and lives on lines of friendship and company with the scab insect, and in no way interferes with the progress of scab. On the 29th December last, in sheep inspector F. J. de Wet's yard at Cradock, the demonstration was instituted as follows:—

(a) "A sheep was produced badly infected with Ked (to which we added another hundred Ked), but free from scab. On this sheep were placed ten scab insects on three separate parts of its body, to wit: four insects on back of right shoulder, three on back of left, and three between its thighs.

(b) "A second sheep was produced free from Ked, and from a flock equally free from such, but infected with a single spot of scab. On this sheep fifty Ked were placed, mostly on, and around the scab-infected part of the body. These two sheep were then placed in two separate small pens in Inspector De Wet's wood shed, where they were

"stabled and fed until last night (4th February, 1910). These proceedings took place in the presence of Chief Sheep Inspector Davison, Messrs P. W. Michau, M.L.C., H. J. van Heerden, A. C. Versfeld, A.R.M., — Heathcote, the reporter, 'Midland News,' Attorney Martyn, Sheep Inspector de Wet, myself, and others.

"Yesterday, 37 days later, this demonstration was brought to a conclusion, when the sheep were viewed by Chief Inspector Davison, Mr J. du Plessis, M.L.A., and Mr. P. W. Puckrin, a proportion of the gentlemen who saw the outset of the demonstration, and others; Inspector De Wet and myself being present. The following was the result found:—

(a) "The sheep which we had infected with scab was found to have developed well-advanced scab behind both shoulders; that on the right shoulder being a patch 3 x 3 inches, and that on the left shoulder being in size 2½ x 3 inches; whilst the spot infected between the thighs, due to oil and urine, had not taken. Under the magnifying glass the infected spots were seen to be very full of scab insects in all stages of growth.

(b) "The scab-infected sheep, which had received the fifty Ked, was found to be infected on four separate parts of its body, also with the insects of various ages, from just hatched-out to adults. The stabling had changed these sheep from out of condition dry woolled merinos, to good condition, oily sheep. Had these sheep remained dry-wooled, there is no doubt their condition as regards scab would have been even worse at the conclusion of this demonstration than we found it.

"These sheep were put out of their misery by being dipped to-day. Under all the foregoing verified circumstances, the intelligent public will once and for all place the Ked at its proper value."

Inspector P. J. de Wet, who undertook the charge of the sheep whilst the experiment was being carried out, reported the progress made from time to time, and gave the following notes:—

"30th December, 1909.—The clean sheep upon which scab mites were placed yesterday, commenced to show signs of irritation to-day, by biting itself between the legs.

"31st December, 1909.—Increased irritation, especially on the spot between the thighs, quite a number of scab mites are visible but few Keds are to be seen near the infected spots.

"6th January, 1910.—The spot of scab which developed on the right shoulder is the size of a florin piece, whilst that on the left shoulder is the size of a shilling. The spot between the legs being about as large as a threepenny piece, this place being extremely oily, the scab has not made much progress. On both sheep a number of Keds are to be seen.

"8th January, 1910.—Several of the eggs laid by the scab mites have hatched during the past few days.

"9th January, 1910.—Eggs are to be found all over the scabby spots. Keds are still plentiful on both sheep. When examining the animals, four or five Keds have been placed on the scabby spots, but they soon disappear, and one only may perhaps be found near the place on the following day. The Keds walk over the scab mites and do not appear to take any notice of them. The infected sheep, from which the scab mites were taken on 29th December last, has now developed several fresh spots.

"15th January, 1910.—When the scab mite is eight days old, the legs assume a red colour, and the insect changes its skin like a locust. An egg of the scab mite taken from the sheep at 9 a.m. was hatched at 9 p.m. the same day. Another egg taken from the sheep in the morning, was hatched by the afternoon, and the insect could be seen through the glass dragging about the remains of its shell.

"24th January, 1910.—The scab spots are growing in size, except the spot between the legs, where the wool is very oily. On one spot the size of a threepenny piece ten scab mites could be seen. Whenever the sheep are examined, four or five Keds are placed on the scabby spots, but I believe a fowl would do better work than the Ked in destroying the scab mites if they could only get to the infected places. Keds are still plentiful on both sheep."

At Queenstown, my assistant, Mr. F. P. Fincham, who interested himself in the matter and carried out an experiment with the Ked and scab mites, reports as follows:—

"In view of the correspondence in the public newspapers about the Ked, which is supposed by some farmers to be a sure preventive against scab, we recently tried some experiments in the Queenstown district with the parasites. This was done by placing a number of scab insects with a few Ked in a white glass bottle, and these insects were daily watched to ascertain if the Ked would devour his smaller brothers, but no such thing happened. These insects mixed freely with each other in a most friendly way, and whenever the Ked came into contact with a scab insect, the little fellows would cling to the Ked, baboon fashion, and have a ride round the bottle on his back. When at last all the Keds had succumbed to the pangs of hunger, the scab insects were still able in the best of health and spirits to attend the funeral of their supposed enemies."

The Ked is in reality a kind of fly, which from having no use for wings, has lost them. On either side of the body may be seen two small bristle-covered round spots (marked E in diagram No. 1.), at points where the wings should be attached. There are several flies well known to farmers in this Colony, which are closely related to the Ked, one being the Ostrich Fly, which is so troublesome in the Midlands and on the Fish River Rand. Another is the so-called Flying Tick or Kimberley Fly, a rather large hard-shelled fly, that annoys horses and cattle in particular, and is very often seen clustered on the hindquarters of the animals it infests. All these flies have mouth parts adapted only for piercing and sucking, and they are extremely annoying to the animals they attack.

Further comment appears to be quite unnecessary, and I trust that those who have been inclined to look with favour on the Ked will, in view of the aforementioned experiments, now estimate the parasite at its true value, and do all in their power to destroy and eradicate the Sheep Louse from their flocks.

The following are the Notes which Mr. Davison contributed to the *Journal* in November, 1908:—

The Ked (*Melophagus ovinus*) commonly known to farmers in this Colony as the sheep louse, has during recent years spread to many parts of the country, and proved most troublesome among flocks of Merino sheep, grazed in the high grass-veld districts. In the division of Barkly East, the pest has developed in a remarkable manner, and but few flocks appear to be wholly free from its depredations.

To a casual observer, some of the sheep examined during a recent visit made to the districts of Barkly East and Maclear, would appear to be badly infected with scab, so torn and ragged were the fleeces. The keds which infested these flocks were present in considerable numbers, and evidently caused intense irritation, as evidenced by the manner in which many of the sheep had scratched and torn out their fleeces, until the animals presented a tattered and unsightly appearance. As many

questions are continually asked by farmers regarding the treatment necessary to destroy the keds, a few facts respecting the life history of the parasite, as well as some hints relative to the most effectual treatment for the destruction of the parasite, may possibly be of use to those who are anxious for information on the subject.

Life History.—Unlike most insects, the female Ked does not lay eggs, but produces maggots, so far advanced in development that they immediately turn to puparia, after being deposited in the wool. These puparia are somewhat like apple-pips in appearance, and are easily seen at the base of the wool fibre of infected sheep. Reproduction is slow, a female lays but one puparium at a time, and only five, or possibly eight during her lifetime. There does not appear to be any definite time fixed for the hatching of the puparia, but, generally speaking, from three to twenty days after the puparia is deposited in the wool, the adult parasite is hatched out. The breeding season seems to be confined to the spring and summer months. The Ked, which is a wingless fly, lives entirely on the sheep. It has six legs covered with hairs and each terminated by a hook. On each side are seven stigmata or breathing orifices. The parasite is provided with a proboscis, tubular and toothed at the end, with which it scratches or pricks the skin of the sheep, and lives on the blood which exudes from the punctured spot, as well as on the debris of the skin. They will draw blood from a man, secreting at the same time a venom which causes swelling and irritation. The Ked may, however, also obtain nourishment from the natural grease or yolk of the fleece which it inhabits. They are found especially on long woolled sheep, and after shearing they leave the shorn for the unshorn or the lambs, where they secure better cover. The lifetime of the female is said by competent authorities to be from three to four months, although it is not denied that it may survive for a period of twelve months. After the female has produced one batch of progeny (say from five to eight puparia) she dies.

To Destroy the Ked.—During 1904 experiments were conducted in Great Britain, with the object of determining which of the sheep dips commonly used by farmers would prove the most effective in destroying the Keds. Some sixteen preparations were tested, but the purpose in view will be served by dealing with a few of the dips well known to farmers in this Colony. A sulphur and lime dip, prepared in accordance with the directions recommended by the Government of New Zealand, for the eradication of scab, which consisted of 25 lbs. of sulphur and 12½ lbs. of lime to 100 gallons of water, had very little effect on the keds. A fluid carbolic dip, which dissolved very readily when poured into cold water, was found to be very effective in destroying keds, but some of the puparia left behind in the bath, or on the sheep, were afterwards hatched out. Tobacco and sulphur yielded good results. The dip was made by steeping 35 lbs. of finely ground tobacco for four days, straining off the liquid and adding 10 lbs. of flower of sulphur, the whole being well stirred to secure an even admixture and the total bulk made up to 100 gallons. The mixture was heated to 110° F., and each sheep immersed for one minute. The animals treated revealed no living keds upon an examination being made subsequent to the dipping, but the puparia were evidently unharmed. Another dip, consisting of tobacco and sulphur mixed with soft soap, destroyed the keds, but some of the puparia afterwards hatched out on the sheep. Any of the sheep dips which are used, arsenical, tobacco or carbolic, will probably prove effective. In connection with the tobacco and sulphur dip already mentioned, I might explain that 36 lbs. of ground tobacco with 10 lbs. of sulphur to 100 gallons of water would probably be equal to one tin of Tobacco Extract mixed with 120 gallons of water, plus the 10 lbs. of sulphur.

As none of the preparations I have mentioned will destroy the puparia, a second dipping is necessitated, and the question naturally arises, what period should be allowed to intervene between the two dippings. Mr. Law, F.R.C.V.S., in his Text Book on Veterinary Medicine, recommends an interval of one or two weeks between the first and second dipping, but, as this writer adds, the puparia hatch out in the course of four weeks, it might be desirable to postpone the second dipping for a longer period. Other evidence shows that the puparia may not hatch out until twenty-one days after being deposited in the wool, and there being no proof that keds can produce puparia within three weeks after they are hatched, the second dipping might be performed about eighteen or twenty days after the first operation. Whichever course may be adopted, both sheep and lambs should be dipped, and the flock placed on clean pasture for a few weeks to obviate the danger of keds being picked up which may have fallen from the sheep.

LIVE STOCK REGISTER AND WAGES BOOK.

By REV. W. G. DOWSLEY.

At the request of several farmers, I have lately been inquiring into the various methods and forms of stock books in use and adaptable to South African conditions. In my opinion, the simplest and best form is that arranged on the "Ledger system," as outlined below. Each branch of stock is allotted a page, and at any time a complete inventory may be obtained by taking out the balances "on hand."

BOOK FOR DESK USE.

(Reduced size.)

CATTLE.												
DATE.	PARTICULARS.						PRICE.			IN.	OUT.	ON HAND.
							Bought or Sold.					
Jan.						£.	s.	d.				
1	On hand	...	...	...	...	...	...	...	...	...	24	
2	Died	...	...	...	...	...	...	...	...	1	23	
4	Bought 3	@	£10	...	...	30	0	0	3	...	26	
14	Sold 14	@	£13	...	...	182	0	0	...	14	12	

This system seems preferable to either of those recently outlined in the *Agricultural Journal* for several reasons: it is much more simple; entails but a minimum of ruling; and, above all, is adapted for use with a pocket-book on same principle for field use by the farmer when checking off the numbers of his several flocks, e.g.

POCKET BOOK FOR FIELD USE.

SHEEP : LONG VALLEY FLOCK.

DATE.	PARTICULARS.	IN.	OUT.	ON HAND.
Jan.				
1	Number in camp at date	...	...	124
2	Drafted to "Springvale" flock	...	50	74
4	Bought 3	3	...	77
14	From "Little Camp"	10	...	87
24	Died	...	1	86

So clear are the advantages of this system that it has recently been adopted by "African Farms, Ltd." in the place of an elaborate system previously used by them, which resembled those outlined in the *Agricultural Journal*. The African Book Co., Ltd. (Grahamstown) is now publishing registers to this design.

I am also frequently asked to recommend a plan for keeping an account of servant's wages, and append a simple form. A separate account is kept for each servant.

GROOM AT £1 PER MONTH.

DATE.		PARTICULARS.	PAID BY CASH.			PAID OTHERWISE.		
			£	s.	d.	£	s.	d.
Jan.	3	Cash	0	5	0	...	...	...
	14	Groceries	...	...	...	0	6	0
Feb.	10	"	...	...	...	0	4	0
	19	"	...	...	...	0	10	0
April	1	Balance of Quarter's wages	1	15	0	...	...	...
		Total wages for Quarter	£2	0	0	£1	0	0

IS SOUTH AFRICA DRYING UP ?

Mr. J. A. van Zyl, of Taaiboschpoort, P.O. Mijfontein Siding, writes:—I have read the article "Is South Africa Drying Up?" of Mr. F. H. Barber in the February issue of the *Agricultural Journal*. I enclose a cutting from the *Agricultural Journal* of the 2nd September, 1897, Vol. XI, in reply to the article of Mr. Barber, as to what should be done to improve the rainfall and to prevent the drying up of the Kalihari. Kindly have that article reprinted in the *Journal*. I hope those articles will catch the eye of some future member of Parliament, who will propose in the Union Parliament to have the Kunene river led again into the Etosha pan, and also to have an inquiry made into what the Dutch hunter told about the Okovango river, which in former years delivered its waters into Lake N'Gami, and to have that river also led again into the lake. This is certain, if the north of the Kalihari should again become a country of lakes and pans, as Mr. Barber found it in 1875, we in these regions would not have so many arid northwest winds, which drive off the rain clouds. If it should not improve the climate here, it would make the Kalihari more inhabitable, and the money, used for the leading off of those rivers, would not have been thrown away.

The following are the extracts referred to:

CONSERVATION OF WATER.

Permit me to send you a communication in German with the request that you will insert it translated in the columns of your esteemed paper.

I have been endeavouring for some time already to promote a scheme for leading off the Kunene River towards the Etosha Salt Pan in order to improve the climate and obtain water for irrigating extensive lands. Although I have not been without success with this scheme so far as its publication is concerned, as the same was discussed in a number of scientific papers, yet opponents are not wanting. Dr. Schinz, Professor at Zurich, advises against the Germans taking in hand the deviation of the Kunene River as this river lies in Portuguese territory at the spot where the deviation could most easily be made, and as the same would chiefly benefit the English. This statement must only be taken to mean that this knower of the country is of opinion that the Kunene after filling the Etosha Basin would flow eastwards, cross the boundary, and throw its chief water supply on to English Territory. Dr. Karl Dove, Berlin, opposes the opinion that the formation of an Inland Lake like the Etosha would result in an improvement in the climate, and points to the lakes of the Suez-Canal, which did not have the anticipated favourable influence. Against this I published a reply which I will shortly take the liberty to send to you. In the same I demonstrated that

on the one hand the amount of water brought to evaporation in the lakes of the Suez Canal is much smaller than the deviated waters of the Kunene, and on the other hand the climatic conditions at Suez are far more unfavourable, which is easily followed from the fact that in spite of the closest proximity of extensive seas the rainfall is so small. There the proportionately small increase in the surface of the water by the formation of those lakes can only have a very small result. The agitation for the scheme seems to bear better fruit in South Africa. I conclude this because after its publication by me in the "Süd-Afrikanische Zeitung" this plan was several times referred to—once by Miss Brincker in the "Globus," and again by Count Pfeil in "Petermann's Mittheilungen." As here in the South the (climatic) conditions are accurately known, and as rainfall is of vital interest to everyone, it is easily understood that the idea will gain adherents here both quickly and in greater numbers. I should be most thankful to you if you would take in hand the guidance of the agitation to the benefit of the whole of South Africa.

I remain, etc.,

(Sgd.) FERDINAND GESSERT.

Inakhab, German S.W. Africa,
June 13th, 1897.

RESPECTING THE IMPROVEMENT OF THE CLIMATE OF SOUTH AFRICA BY MEANS OF ARTIFICIAL ACCUMULA- TION OF WATER.

In the *Agricultural Journal* of the 7th January, 1897, Mr. W. Roe recommended converting the rivers of Cape Colony into a chain of lakes by means of suitable barriers in the valleys, partly to obtain the water for agriculture and partly to improve the climate. With such works it is best to begin where with the least materials one can effect the most results. The cheapest barriers for valleys relatively speaking are the North American lake barriers. The Swiss also use their lakes for purposes of storing (water), as they led the flood waters of the Aar into the Bieler See to prevent inundations. If one undertakes the task of diminishing the dryness of the atmosphere of South Africa and improving its climate by means of accumulations of water, it is worth while to take notice of the rainfall. The inner provinces are almost exclusively dependent on thunder rains. Thunder-storms arise mostly through the upward current of air. It is less the vapour of the sea which falls in the interior of our continent but rather in the afternoon the masses of water fall as rain which have been evaporated a few hours before a few miles to the northward. At a certain height a north Trade-wind is prevalent. This wind brings the storm clouds southwards. In Spring the rain gradually passes south. As long as it has not rained in Ovampoland it cannot possibly rain in Damaraland and Namaqualand. Only when the former evaporates sufficient quantities of water the storm clouds begin to form also in the South. If the required amount of water is there it often rains for weeks almost daily. In the absence of larger lakes in South Africa the anxious spectacle repeats itself annually: Will sufficient masses of water pour down or will the North Trade-wind—the high one—carry the moisture taken up in the tropics to the sea, as the upward current from the glowing steppe is too warm and dry to produce sufficient condensation? The

belt of steppes which extend from Damaraland far beyond the Kalihari creates the irregular rainfall. Matters would stand far different if that belt were bounded on the north by a chain of large lakes. If the pans which extend from the Etosha Pan towards the Ntwe-ntwe and the Makarikari showed a constant surface of water, then we could predict with certainty that the upward current would absorb sufficient moisture from their cool surface and growing cold in ascending condense its own and the Trade-wind's vapours and cause an energetic cloud formation. In order to reach this ideal Nature has made wonderful advance works! The rivers northwards of this chain of Pans incline to bifurcation. Both the Kunene and the Loango during flood time throw masses of water southwards towards the Etosha and the Okavango. With a comparatively small expenditure it is possible owing to the perfectly level country to make this southern course the constant one by means of a dyke across the old bed of the stream. When the Etosha Pan has been converted into a lake and the Ngami Lake has been enlarged, it will not be long before the Botletle will discharge its waters also into the Makari Lake. I do not here desire to speak of the incalculable profit which would be derived from an excellent waterway which would stretch from West to East almost right across the continent. I desire here only to point out that this action would be the best foundation for the building of further dams by increasing the thunder-rains. For dams pay better, the greater the probability is that they will annually fulfil their destination, the more frequently and stronger it rains. We should not look upon it as an unsurmountable obstacle that the rivers which are to feed this vast region of lakes with water, flow through different Territories. The improvement of the climate here is not a Portuguese or English or German question but a South African one in solving which we must proceed without jealousy.

GIANT TWIG GALL, OF WILLOW, POPLAR, PEACH, APPLE, AND OTHER TREES.

CHAS. P. LOUNSBURY, Government Entomologist.

These notes are to record the little that is known in regard to a tree trouble that seems to be causing much apprehension amongst tree lovers in the north-eastern part of the Cape Colony. The name used in the title is suggested for it, as a descriptive term is desirable, and as no more suitable one occurs to the writer. The illustrations herewith will serve for the ready recognition of the trouble in the absence of any other with which it might be confused, and no other trouble in the country is known to resemble it more than the very common "knot" that occurs throughout the land on quince trees.

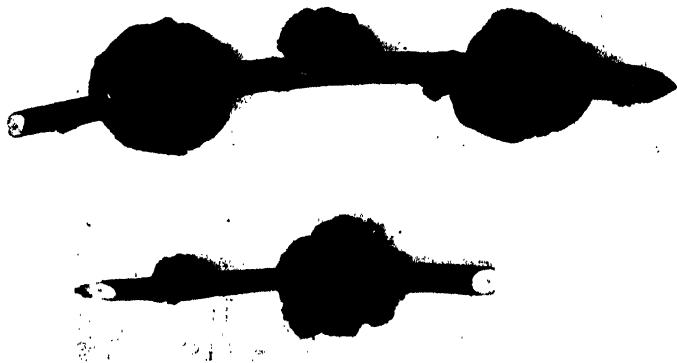


Fig. 1.—Showing growth of galls on willow twigs. Natural size.

DESCRIPTION.

The galls are rather light but firm woody, roundish outgrowths on the twigs and smaller branches. They appear to start from a single small point and to extend rapidly, at least at first, in all outward directions. The bark surface is followed closely, and thus the gall may grow to encircle the stem that bears it. The surface is rough and more or less fissured with cracks, sometimes shallow and sometimes deep, in all directions. Often the fissures give the gall the appearance of being a conglomeration of roughly angular lumps, or a resemblance to the brain of an animal—which resemblance is particularly suggested when the gall nearly surrounds the twig. When small, the galls are usually brownish.

As they grow larger they tend to darken and in some localities they may become greenish through an overgrowth of alga. The writer is familiar with the trouble only through correspondence and the examination of specimens which have been cut off and sent to him, and he is unable to say how long the galls continue to grow. It seems probable that they may continue to develop for several years if the twig or branch does not perish meanwhile. One specimen that was sent to this office measured five inches in length and three and one half in diameter. It is on a willow stick that is seven-eighths of an inch through below the swelling and five-eighths above it. Much larger galls than even this one are said to occur, but ones under three inches in length are far more numerous.



Fig. 2.—Showing both sides of large gall on willow branch. Natural size.

PLANTS AFFECTED.

Willow (*Salix babylonica*) seems more commonly affected than any other tree. Then, to judge by the complaints received, poplar (*Populus alba*), peach and apple are most attacked. Apricot, pear and rose are also said to suffer. The twig beyond the excrescence is checked in its growth and dies off prematurely. Our correspondent says: "After the growth has covered the bark, the branch dies off; or, as in willows, is so much injured that it falls or blows over." Another: "It (the excrescence) gradually increases in size, encircling the whole circumference of the branch, with the result that the part distal to the seat of the disease gradually dies and falls off." It appears that the galls get exceedingly abundant on some trees and that the trees may therefore become severely disfigured and damaged.

The earliest record of the trouble that is known to the writer is a letter, from the Civil Commissioner of Aliwal North, that was published in the *Agricultural Journal* for October 12th, 1899. This letter stated that the disease had appeared a couple of years before on willows along

WHERE FOUND.

the banks of the Holle Spruit and that it then was present for several miles along the stream. Complaints during the past year have come from Indwe, Dordrecht, Maclear, Gubenza (Elliot), and Umtata. One of the Department officials states that he has seen it near Toise River and near Alicedale. That it occurs far removed from the north-eastern parts named is shown by a recent communication from the Acting Entomologist of the Transvaal, which states: "While visiting the town of Wakkerstroom recently I discovered that nearly all the willow trees in the town were dying on account of large galls, and I take the liberty of forwarding specimens to you. It appears that these galls were first noticed upon willow trees about eighteen months ago." Wakkerstroom is in the south-eastern part of the Transvaal, and about three hundred miles in an air-line from the nearest point in the Cape Colony where the disease is above recorded.

CAUSE.

The cause of the disease is in doubt. There is little or nothing to suggest that it is of insect origin. Boring insects are sometimes present in the galls but they obviously appear after the growth is advanced. Most of the affected twigs submitted for examination have shown scars of what appeared to be hail injuries and this fact suggests the idea that the trouble begins at wounds. Mr. C. W. Mally, the Eastern Province Entomologist, saw affected trees at Umtata in October, 1909, and reported: "I could find no trace of insect injury, although many of the younger swellings look as if they might have started from egg punctures made by leafhoppers. Hail injury may be the starting point for some of the knots, but the majority start without that. What may be the earliest trace of the disease appears like rather large lenticels."

A report on the matter by the late Professor MacOwan is given in the *Agricultural Journal* mentioned above, in the course of which it is stated: "Precisely similar out-growths are very common upon *Rafnia angulata* (Thb.), a leguminous shrub growing about the slopes of Table Mountain, and are demonstrably caused by the parasitic fungus *Aecidium resinaecolom*..... A fungus has not actually been detected in the escrevences submitted....." The present writer deems the growths on *Rafnia* quite distinct from those under discussion, and does not think that Professor MacOwan meant to imply more than that the one trouble like the other was probably of fungous origin. That a fungus is responsible has been the view of the Eastern Province Entomologist and of Mr. James Sim, the District Forest Officer at King William's Town, who also has examined affected trees, and also the writer; but the view has been based on general observations only and not on the discovery of any one fungus in association with the galls.

Two lots of typically affected twigs were submitted from this office to Mr. I. B. Pole Evans, the Transvaal Plant Pathologist, during August last, and a lot from Wakkerstroom was later submitted by the Transvaal Acting Entomologist, but Mr. Evans was unable to throw any light on the subject. He reported that he found sterile mycelia present in the first specimens, but that it was impossible to say if this was the cause of the knots. It may with advantage here be mentioned that the positive determination of the cause of such a trouble as this one is often a matter of considerable difficulty and one which may require a great deal of time and close study. In America the exciting cause of a disease of plum and certain other trees, called Black Knot, which like

the present one is characterised by a large excrescence on the twigs and branches, remained undiscovered for a very long time. Most diverse explanations were offered to account for the swellings and found more or less acceptance, but finally it was established that a fungus was the responsible agent. Similarly the cause of the rough lumpy growths on quince trees, common in California as well as here, long baffled discovery. Only recently Mr. Pole Evans discovered that they were associated with a particular fungus. It may be that many years will elapse before the exact nature of the Giant Twig Gall is demonstrated.

If not due to a fungus, it seems probable that the trouble is due to a bacterium, as somewhat similar tree growths in America have been found due such an organism. Specimens of our trouble were sent from this office to the Chief of the Bureau of Plant Industry, Washington, in November last, for the favour of any information his experts might be able to offer. Dr. C. O. Townsend dealt with the matter and in the course of his kind reply he wrote: "..... We have examined the specimens of willow, peach and apple which you sent under separate cover, and find that these galls are very similar to some that we have been studying for some time and which are produced by bacteria..... We have been able to get galls by inoculation with these organisms not only upon the willow, peach and apple, but upon a large number of other plant species." Dr. Townsend in his letter alluded to a technical note on the subject which he had published in *Science* for February 12th, 1909, and further stated that his Bureau would shortly publish a bulletin in regard to it. This American trouble was first studied on Paris daisy plants. It seems improbable that it is identical with the South African trouble under discussion.

REMEDIES.

Whatever may be the cause of the Giant Twig Gall, there seems no doubt that the disease propagates itself and is likely to injure willow trees grievously and to do more or less damage to other kinds of trees wherever it makes its appearance. Therefore, wherever it is practicable, it is advisable that the twigs bearing excrescences should be cut and burned. Small galls should not be overlooked.

Mr. Sim, the forest officer above mentioned, writes as follows regarding the treatment of affected willow and poplar trees: "These trees stand pollarding and even coppicing right back and will throw up strong shoots from the stump. It seems therefore the right thing, when trees are badly affected, to cut them back as far as necessary even if that means cutting them right down to the ground, and to burn all the cut off material without delay. The coppice shoots will then require to be watched and any portion showing warts cut out and destroyed. Eventually the shoots should be thinned out so as to leave a strong healthy one to make the future tree." Mr. Sim recommended the course suggested to the municipal authorities at Dordrecht in 1908 with respect to some affected white poplar trees. In response to an enquiry from him a year later the Town Clerk wrote: "All the parts affected were immediately cut down in accordance with your recommendation, and I am sure the result is of great benefit. There are a few (galls) come on again, but not many." It appears that willows have been affected at Dordrecht for some years, but that the appearance of the trouble on poplars was relatively recent and had followed a very severe hail storm.

Parties resident in localities where the trouble does not occur should abstain from taking willow and poplar cuttings for planting from any place where it has appeared.

THE INFLUENCE OF FORESTS ON WATER SUPPLY.

Paper read by Mr. E. R. Bradfield before the Afrikaander Bond Congress, 1910.

I am very much gratified at being present at this important gathering of farmers and men representing the views of the landed interests of such a large section of the South African community. First of all because as a South African whose interests and love of country are identical with your own, this question of erosion and conservation of our resources, upon which I have the honour and privilege to address you, has always appeared to me as demanding attention from the Government and the people as one of the greatest dangers and evils that threaten us.

The warning came to me forty-four years ago. A young engineer from India who came out to this country to recruit, and who stayed some little time with me as my guest, drew my attention to a small slit in the course of formation caused by cattle tracks. He said if I wished to preserve the farms it was advisable to stop these small beginnings at once, showing me how easily it could be diverted. He described whole tracts of country in the Orient that had been totally ruined by the denudation of its natural timber, overstocking and negligence. Needless to say that I adopted his advice, and had the gratification of being told some years afterwards by the later purchaser that he had paid £3,000 more for that property than he could have obtained the adjoining land for, simply owing to its preservation from dessication. So much for good and timely advice.

This gentleman, who was a bit of an enthusiast, and from his experience was able to discount the future as well as being endowed with considerable intelligence, said that this was essentially a matter for state investigation, and if necessary state intervention, to prevent a recurrence of the dire consequences which had converted so many fair regions into howling wildernesses.

Since then I have never ceased to preach these doctrines, and both by precept and example in my own small way have tried to show, not alone for our own sakes, but for the sake of coming generations, for whom as custodians we hold this heritage in trust, the necessity of observing this sacred trust.

This sounds like egotism, but you are bound to speak from experience if you want to bring home facts which so many of my countrymen here present can verify.

At the time of this visit I was living among the Voortrekkers in the Upper Stormberg, which was practically a virgin country dressed in all its pristine glory as it were, fresh from the hands of the Creator with its wealth of herbage, its unbroken plains, dotted over with sleek cattle and horses, standing knee-deep in succulent grass, its wide spreading marshes

and lakelets teeming with myriads of waterfowl, literally darkening the air as they rose in clouds from these life giving waters. These are now, alas, converted into dry dongas, or swollen to abnormal dimensions by torrential floods, are acting as mediums for carrying off the inherent wealth of the country in the form of the precious soil. Who could have imagined that in so short a space of time the dire forecast of this far-seeing young man would have been so fully realised; but so it is, and if this transformation has taken place in this period by our criminal neglect, what may we expect in a decade or two, unless we are aroused by some common action to grapple with it in a national spirit as so many of the older countries are doing not only by combination among landowners themselves on an extensive scale, but by seeking Government co-operation and invoking the aid of Legislative bodies to enforce drastic laws.

In France they are spending many millions and giving employment to a good many thousands in the work of reclamation and reafforestation, to minimise the disastrous floods and the wholesale destruction of the land, the result of deforestation and the denudation of past generations. The beneficial effects of this work are already being felt in a marked degree in the land which had become untenable.

In Germany, through the unique system of her forestry laws extending over a long period, her revenue has been increased by some forty millions, giving direct and indirect employment to between five and six millions of her subjects. Norway, Sweden, and Austria have adopted forestry laws, and the work of reclamation, which the limits of my paper will only permit me to touch upon in passing; while in India and many parts of the Asiatic Continent the very drastic conservation laws which they have been obliged to introduce, together with their mighty irrigation works have restored many millions of acres of waste land and given sustenance to the starving millions of their subjects.

The good that has been done by the British Government in this respect has been incalculable, and has served to stimulate others of her neighbours, who, by seeing the beneficial influence of these laws in restoring vast tracts of country from decadence to comparative prosperity have realised the full importance of instituting similar laws to save their countries from impending ruin. To my surprise in reading a work recently upon those marvelously adaptable people the Japanese these influences have been extended to countries like the Formosa, who so recently have been under the thralldom of barbarianism; while the Philippines under the influence of American administration have also gone in for conservation and reorganisation of their forest lands. America herself has added millions upon millions of acres to her national parks, until now she has something like 168,000,000 of acres in the west alone demarcated for this purpose; State working with State in a truly national spirit to acquire more and more land to head her great navigable rivers and reclothe her denuded heights.

This shows how the whole world is being roused into action to combat a great evil and the unanimity that exists in the national interests where State rights were maintained and upheld even at the point of the bayonet. Surely, gentlemen, these great examples of a country uniting to cope with a common danger ought to act as an inspiration to us to unite and organise our forces in a brotherly and national spirit to confront a great national peril. We may talk of nationalism, and of racialism prevailing in this country, but friends and countrymen, until we can eradicate this spirit of antagonism and lay the weapons of political warfare on one side like the Americans we are never going to succeed in building up a great nation, for the old axiom of the Bible uttered some 2,000 years ago of a nation or kingdom divided against itself not being able to stand is as true now as ever it was. Gentlemen, our wise men and leaders have seen the folly of

maintaining separate interests in this huge sub-continent with its vast undeveloped possibilities, and we are now about to unite as a nation. Let us also try and unite for a purpose in trying in the spirit of the Convention to as far as possible promote peace, harmony, and good will at its very inception.

Listen to the earnest and patriotic sentiments of Governor Glen, who had fought as a confederate soldier in the war of secession, but who had now come to the Governor's Conservation Conference to plead the cause of the South in the great schemes that were being inaugurated to save the country from desiccation and ruin.

I can only give a short extract from this brilliant speech which was greeted with frequent bursts of applause, but it serves to show the spirit that animated the Conference.

After urging the Conference in the most eloquent terms to bring pressure upon the National Congress to acquire certain lands for afforestation purposes, he said men, Governors, Governors of the great west, our members have stood by you in your forest preservation; we have stood by you in your irrigation acts; we have stood by you in every single thing for the up building and glory of this great nation in which we live, and coming to-day voicing the people's voice, the voice of (mentioning several States) he said: I plead with you and beg of you to come to our relief and join with us in helping to save the country from this waste and devastation. We will plant our crops, we will plant our grasses; but, sir, as long as floods continue to come tearing and rushing down our steep, unforested heights, into the valleys and rivers, the crops which we may plant are worthless.

In reply to a question that they should confederate and not ask help from the Union, he said: We tried confederation once and it did not pay. You told us to come into the Union, and make our request, do not rebuff us the first time we ask. "Thank God, as was said yesterday, there is no north, no south, no east, no west. A confederate son and soldier stands before you, who would die for his country and his state because he loves it, and that confederate soldier is just as true to the Union as any man born in the north can possibly be."

This is the spirit we must try to inculcate among South Africans. We must try to take a wider outlook and view these things more from a National standpoint. We must try to strengthen the hands of the Central Government if we are satisfied that their policy is a progressive one, and that they are working for the upbuilding of the commonwealth.

It is the policy of the Co-ordination of the State with the Central Government that has been pursued of late years together with the Co-operation of the people that has helped to solidify and unite the American people as they have never been united before. Referring to this question of waste of national resources another speaker said: For this existing condition there must be a remedy, but where must this remedy come from. It must come alike from the states and the nation, State going hand in hand with State, and the states joining with the nation. President Roosevelt, in his opening remarks said:—The prosperity of our people depends directly on the energy and intelligence with which our resources are used. It is equally clear that these resources are the final basis of national power and perpetuity. Finally it is ominously evident that these resources are in the course of rapid exhaustion. Then quoting from a lengthy judgment of the Supreme Court of Maine referring to state restrictions over private rights, he said the Court unequivocally laid down the principle that the property rights of the individual are subordinate to the rights of the community in the case of national exigency. Again the quotation would be too long for my space, but he argues all the points in a lawyer-like fashion, quoting other authorities in support of his statements that private interests

must give way before the public when a nation is menaced by a great danger. This opinion was rendered in response to questions as to the right of the Legislature to restrict the cutting down of trees on private land for the prevention of droughts and floods, the preservation of the natural water supply and the prevention of the erosion of such lands and the consequent filling up of rivers, ponds, and lakes.

Right throughout the whole of the proceedings the same earnest spirit prevailed, and testimony upon testimony was given of this wilful destruction in such words as these: "The wildest anarchists determined to destroy and overturn the foundations of Government could not act in a more irrational and thoughtless manner than have our people in permitting such fearful destruction of the very source of our power and greatness." The speaker generally entered into detail of what these losses meant to the state, ending in a powerful appeal to the Legislature to step in with the iron-hand of the law to prevent this holocaust of Nature's most precious gifts.

But are we not equally criminal? Will we not be made to pay the same heavy penalty for the neglect of nature's inexorable laws, but perhaps in a greater degree, for we have no protecting forests of any consequence, and the majority of people seem totally oblivious of the danger. Here and there you hear a warning voice. Some time ago Mr. Chas. van Rooy delivered a lecture to his constituents on the subject, I think the only member of Parliament that has done so, and Mr. George A. Scott, the timber merchant, of Cape Town, has also contributed a valuable article to the "S.A. Commerce and Manufacturers Record," upon forestry, showing the limited area we have under forest, the large quantity of timber we are importing, the shortfall of the timber supply of the world, its increasing price and the desirability of promoting forestry in a treeless country such as ours. Altogether it was an excellent and practical paper which I heartily welcomed, more particularly as he also dwelt at some length upon the devastation of the country through the absence of forest-growth. But how seldom is this vital question brought up at farmers' associations, Bond meetings, or agricultural society meetings, where one would naturally think greater interest would be taken. In justice, I will say this, that our several experts who have come out under Government auspices have never failed in their duty to point out in earnest and drastic language the urgent need there is for veld conservation and all else connected with the preservation of the country.

But, gentlemen, is it not that we ourselves work up, and by organisation and in a united spirit tried to overcome these difficulties. Much could be done by combination to prevent sluicing if farmers could only agree to some kind of common action by diverting the flood water at different levels as it passes through their respective farms, or planting the kloofs or valleys where they take their rise.

It is simply wonderful how much has been accomplished by co-operation in the small holdings of France, Germany, and Denmark.

When co-operation was on the tapis and Mr. Hannon was touring the country I interviewed him and told him that I thought the chief thing to make co-operation a success, and particularly in dairying, was first of all to get the farmers to co-operate for water, when other things would follow; but he thought if he could establish the principal other things would follow as a natural sequence. Unfortunately, both for him and the country, it didn't pan out. Otherwise if the seasons had been propitious and success had attended his first efforts they might have been the means of establishing some valuable industries, for the principle has been proved even in British Colonies. The Crofter settlement in New Zealand is a noticeable instance of this, dairying being a marked feature of this success, owing to irrigation. The same thing obtains in Australia, and Mr. Bent,

the then Victorian Premier, lecturing before the Colonial Institute said the first and primary essential was water, and in connection with the land settlement policy the Government was determined to see that there was no doubt about the supply to guard against drought. In the reports I have read of some of their colossal undertakings they have carried the water over great distances to the arid regions. In one case in Western Australia after pumping the water to three different levels with three sets of pumping machinery and three storage reservoirs they have conveyed the water for 100 miles, while in America they have carried it for hundreds of miles, and established prosperous communities where only the sago bush grew before, with the desert sands all around them.

The latest thing in irrigation comes from Canada, in the semi-arid region of Alberta, where the Pacific Railway is carrying out a three million acre scheme on a stretch of country of 150 miles long by 40 wide., comprising 4,000 miles of canals and waterways. With these feats to remind us of how they have faced and overcome difficulties, I think I am justified in saying that they would not be long in availing themselves of our opportunities to regenerate their country. Contrast this gigantic undertaking, at once providing for population and produce to feed their railways, with our own lines running practically empty through a large section of the desert Karoo requiring five acres to feed one sheep, half of which are swept off by every recurring drought. Wilcox, who is now engaged in a great scheme for revitalising the Mesopotamian Desert—propounded a scheme for canalising the Orange River, whereby some of these non-producing regions would have been rendered equally productive with that of the American deserts, but it never got beyond the paper stage, whereas little Victoria, about one-third of the size of the Cape Colony has spent £12,000,000 in reclaiming her waste lands, and at the present moment is advertising for 40,000 families for settlement purposes.

These titanic efforts of younger nations to conquer nature and make it subservient to their needs ought to be an incentive to us to try and capture the gifts of Providence which at times she bestows with such a lavish hand.

What I particularly wish to impress upon my auditors is with the evidence I have adduced of the financial straits of other countries, no matter how reduced may be a country confronted with a great national danger or possessing great possibilities is perfectly justified in raising loans to save itself by the promotion of reproductive works, not wild cat schemes or political railways, but something to feed those railways and take the people back to the land. They would then become valuable adjuncts to development as they are in Victoria and Alberta.

What I chiefly apprehend is that if we cannot draw population and population of the right kind who will till the soil and remain permanently on the land we will eventually be crowded out by the coloured races, who under our protection are increasing at a tremendous rate while we are stagnant or are actually decreasing owing to the large exodus from South Africa.

This is a serious aspect of the question, and it has several times excited comment. Especially in districts where natives have clubbed together to buy out their white neighbours. Now I don't for a moment wish to infer that because their rate of progression, or should I say, fecundity, is greater than ours that they have no right to expand. This is our common country, and they have the same right to be here as ourselves, but as the dominant or governing race, it is a duty imposed upon us to preserve it both for their sakes as well as our own; for, however distinct we may be as a people, the interests of the country are so bound up together that what concerns one part concerns the whole.

Taking this view of the question and also because native territory as a rule through overcrowding, overstocking their small holdings, their propensity to make footpaths often only the beginning of dongas, their improvidence of Nature's gifts, careless methods and indifference as to results are factors for bringing about rapid depletion of the soil impelled me to write to the press and the Government pointing out the danger. This was about 1903. On my return, I found that the acorn crop was coming in and as they were being gathered at a nominal cost, I again wrote to the Government suggesting that a few hundred bags should be sent to different centres and particularly to native chiefs and headmen. They have a great idea of the word of the Government as they call any special message to their Magistrate from headquarters.

Knowing what I do of native character, I feel convinced that they would have taken it as an instruction, or I thought that the Native Councils may be induced upon agreement of a kraal or community to fence off a portion of land for the purpose of tree-planting; provided they were promised a subsidy by Government after a period of years when the trees were established, considering the benefits that must inevitably follow. It is an experiment well worth trying. Though without proper restraint as I have said, their propensity is rather to destroy than to promote. Yet they are amenable to law, and under the guidance of a capable official in whom they have faith, they would easily fall into line.

We have an instance of this in the Cala Show, inaugurated by Mr. Charles Levy, during his term of office, who also taught them to plant trees. These Shows, I understand, are kept up with unflagging interest, and from an educational point of view are doing a great deal of good in the introduction of better stock and cereals.

I could say a good deal more upon this question, but I find that I have already exceeded my limits. I may, however, say that during my stay at Indwe I visited the Poor White settlement of Bogoto, under the Drakensberg Mountains. This is an ideal spot for tree-planting. Both soil and climate seemed admirably adapted to the purpose, and there are still fragments of the primeval forests in the many kloofs which could easily be extended. I found the erf-holders all eager for tree seeds. This I represented to Government through the Forest Department at the same time volunteering to distribute them gratis, but owing to the rigid retrenchment that was being practised I was informed that they could not comply with my request. But what grieved me most was that owing to the financial strain that the country was undergoing, Government had been obliged to abandon the Dordrecht and I suppose other plantations upon which considerable outlay had been incurred.

This is a retrograde step which I sincerely hope will be remedied as soon as circumstances permit.

I see by the last issue of the "United Empire" that Canada, following in the wake of France, Germany, U.S.A., and other countries, has appointed a commission to inquire into the wanton waste of forests, lands, minerals, etc., the guiding principal of which is the resolution adopted at the North American Conservation Conference at Washington referred to. This shows the great importance that is attached to it by all the most advanced countries.

But Germany, not satisfied with conserving her own forests, etc., the paper says, has established a school of forestry on the German model in her Chinese Colony, Kiachow, thus extending the benefits of civilisation and progress to even these distant regions.

THE CIRCULAR DIPPING TANK, WITHOUT CENTRE PILLAR, AND ITS ADVANTAGES OVER OTHER TANKS.

Mr. W. J. van der Merwe, Assistant to Chief Inspector of Sheep, writes:—In response to constant inquiries *re* the most suitable dipping tank, I have pleasure in supplying you hereunder with diagram, dimensions and particulars of a circular dipping tank without pillar, which as the result of a great deal of experience of all kinds of dipping tanks, I can recommend as the most suitable and economical.

PLAN—TO HOLD 450 GALLONS.

It will be seen that the diameter at the very top of the tank from A to B is 4 ft. 6" and that 9 inches down, from C to D the diameter is 5 ft. There is therefore a choke of 6 inches altogether at the top to prevent the water from splashing out whilst dipping.

The tank gradually becomes narrower towards the bottom till about a foot from the bottom, from E to F, the diameter is 3 ft. 6", the bottom to be gradually rounded like that of a huge soap-pot. The total depth from G to H to be 5 ft.

The outlet, marked N, to start about 1 ft. from bottom of tank and to be 15 inches wide at bottom and 22 inches at top, as shown on diagram marked M. The outlet to be 7 ft. long from where it starts at bottom of tank and terminates at the gate of draining kraal, and length of outlet from top of tank to gate of draining kraal marked K to be about 5 ft. 6".

The double line with letter O indicates the place for the sluice gate at egress from tank into draining kraal.

It will be observed that the tank is more or less in middle of the catching kraal which enables different men to put sheep in tank at the same time without being in each others way, or putting sheep one on top of the other.

I consider the above tank quite big enough for a farmer owning from two to three thousand sheep, but of course its capacity could be extended according to taste. As given above from 7 to 8 full grown sheep could be put in at the same time, with comfort.

I heartily endorse Mr. S. A. Cloete's remarks in your issue of February last:—

(a) The circular tank with centre pillar although a good tank if properly constructed, and a great improvement on the long tank, had to make room on a few farms in my area for the tank without the pillar, as described above, and all the farmers, without exception, who used this tank once, tell me they would regret ever using any other again.

(b) Inefficient dipping is largely responsible for the amount of scab we still have to fight against, and I often found it impossible to do thorough work in a long tank.

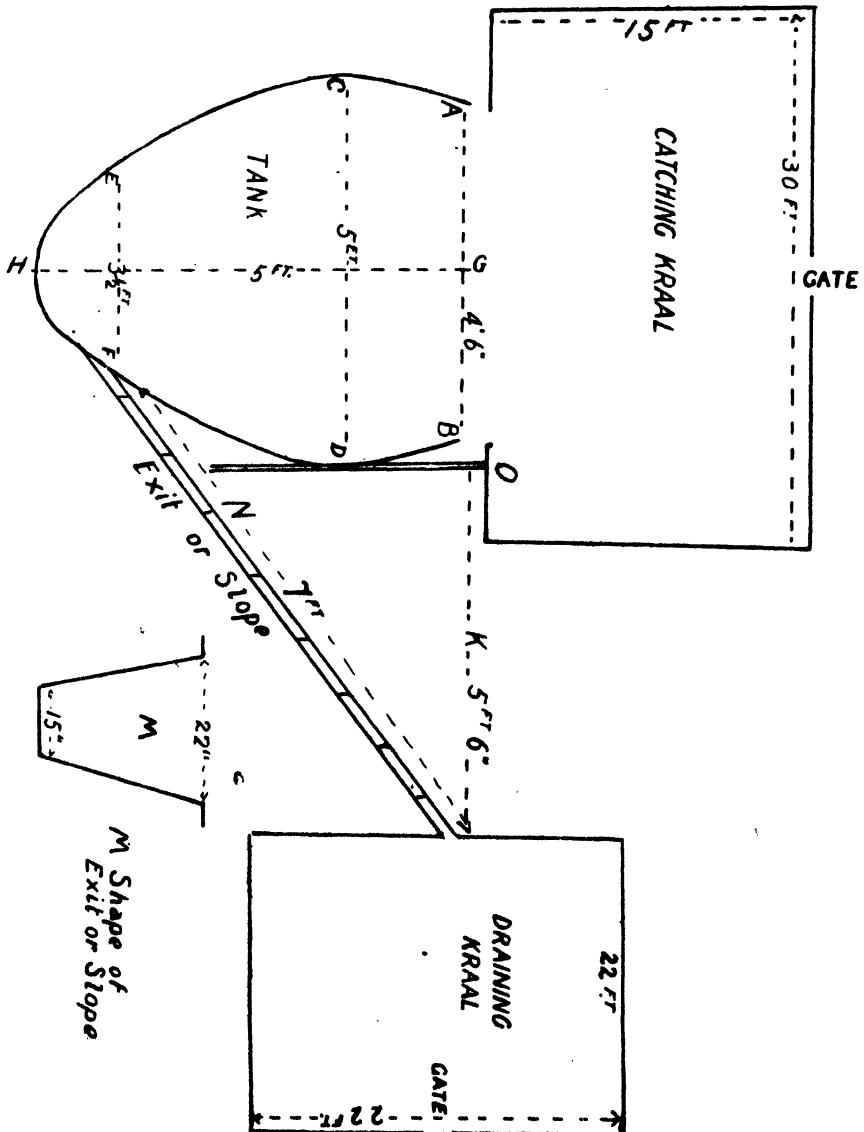
(c) Stock suffer much less in the circular tank without pillar, because there is not that crowding against each other in one corner, and climbing on top of, and drowning each other as is unavoidable especially in the long tank, neither that turning forward and backward of the poor animals by the dipping fork, which is absolutely required in the long tank.

(d) In the circular tank without the pillar there is none of this crowding and climbing on top of each other, and one man with dipping fork has full control over animals in the tank; whilst to work is less tiring to both men and sheep, and very much more thorough.

With a tank like the above and a thorough knowledge of the use of lime and sulphur or caustic soda and sulphur, and the necessary precautions taken with infected sleeping places and kraals, no farmer should own an infected animal.

Another point in favour of this tank is the convenience and economy that can be exercised when only a small flock has to be dipped, when the tank need not be filled, but just as much dip mixed as is required, as one has all the water together in one spot, like in a big soap pot. I shall be pleased to supply any further information which may be required.

In order to have the tank perfectly round a form should be made with a few planks.



REINFORCED CONCRETE FENCE POSTS.

("United States Farmers' Bulletin.")

There is a constantly increasing demand for some form of fence post that is not subject to decay. The life of wooden posts is very limited, and the scarcity of suitable timber in many localities has made it imperative to find a substitute. A fence post, to prove thoroughly satisfactory, must fulfil three conditions:—1. It must be obtainable at a reasonable cost. 2. It must possess sufficient strength to meet the demands of general farm use. 3. It must not be subject to decay, and must be able to withstand successfully the effects of water, frost, and fire. Although iron posts of various designs are frequently used for ornamental purpose, their adoption for general farm use is prohibited by their excessive cost. Then, too, iron posts exposed to the weather are subject to corrosion, to prevent which necessitates repainting from time to time, and this item will entail considerable expense in cases where a large number of posts are to be used. At the present time the material which seems most nearly to meet these requirements is reinforced concrete. The idea of constructing fence posts of concrete reinforced with iron or steel is by no means a new one; but, on the contrary, such posts have been experimented with for years, and a great number of patents have been issued covering many of the possible forms of reinforcement. It is frequently stated that a reinforced concrete post can be made and put in the ground for the same price as a wooden post. Of course, this will depend in any locality upon the relative value of wood and the various materials which go to make up the concrete post; but in the great majority of cases wood will prove the cheaper material with regard to first cost. On the other hand a concrete post will last indefinitely, its strength increasing with age, whereas the wooden post must be replaced at short intervals, probably making it more expensive in the long run.

In regard to strength, it must be borne in mind that it is not practicable to make concrete fence posts as strong as wooden posts of the same size; but since wooden posts as a rule, are many times stronger than is necessary, this difference in strength should not condemn the use of reinforced concrete for this purpose. Moreover, strength in many cases is of little importance, the fence being used only as a dividing line, and in such cases small concrete posts provide ample strength, and present a very uniform and neat appearance. In any case, to enable concrete posts to withstand the loads they are called upon to carry, sufficient strength may be secured by means of reinforcement, and where great strength is required this may be obtained by using a larger post with a greater proportion of metal, and well braced, as is usual in such cases. In point of durability concrete is unsurpassed by any material of construction. It offers a perfect protection to the metal reinforcement, and is not itself affected by exposure, so that a post constructed of concrete reinforced with steel will last indefinitely, and require no attention in the way of repairs.

REINFORCEMENT.

No form of wooden reinforcement, either on the surface or within the post, can be recommended. If on the surface the wood will soon decay, and if a wooden core is used it will in all probability swell by the absorption of moisture, and crack the post. The use of galvanized wire is sometimes advocated, but if the post is properly constructed, and good concrete

used, this precaution against rust will be unnecessary, since it has been fully demonstrated by repeated tests that concrete protects steel perfectly against rust. If plain, smooth wire or rods are used for reinforcement, they should be bent over at the ends, or looped to prevent slipping in the concrete. Twisted fence wire may usually be obtained at a reasonable cost, and it is very well suited for this purpose. Barbed wire has been proposed, and is sometimes used, although the barbs make it extremely difficult to handle. For the sake of economy, the smallest amount of metal consistent with the desired strength must be used, and this requirement makes it necessary to place the reinforcement near the surface, where its strength is utilized to greatest advantage, with only enough concrete on the outside to form a protective covering. A reinforcing member in each corner of the post is probably the most efficient arrangement.

CONCRETE FOR FENCE POSTS.

The concrete should be mixed with Portland cement in about the proportion 1 : 2½ : 5, broken stone or gravel under one half-inch being used. In cases where the aggregate contains pieces smaller than one-fourth inch less sand may be used, and in some cases it may be omitted altogether. A mixture of medium consistency is recommended, on the ground that it fits the moulds better and with less tamping than if mixed quite dry.

MOULDS FOR FENCE POSTS.

Economy points to the use of a tapering post, which, fortunately, offers no difficulties in the way of moulding. All things considered, wooden moulds will be found most suitable. They can be easily and quickly made in any desired size and form. Posts may be moulded either in a vertical or horizontal position, the latter being the simpler and better method. If moulded vertically a wet mixture is necessary, requiring a longer time to set, with the consequent delay in removing the moulds. The mould used here has a capacity of four posts, but larger moulds could easily be made on the same principle. It consists of two end pieces carrying lugs, between which are inserted strips. The several parts are held together with hooks and eyes. To prevent any bulging of the sides trips they are braced. Dressed lumber at least 1 inch thick and preferably 1½ inch, should be used. The post made here measures 6 in. x 6 in. at the bottom, 6 in. x 3 in. at the top, and 7 ft. in length, having two parallel sides. If it is desired to have the posts square at both ends, the moulds must be arranged accordingly. This latter form of post is not as strong as the former, but requires less concrete in its construction. Great care in tamping is necessary to ensure the corners of the mould being well filled, and if this detail is not carefully watched the metal, being exposed in places, will be subject to rust.

ATTACHING FENCE WIRES TO POSTS.

Various devices have been suggested for attaching fence wires to the posts, the object of each being to secure a simple and permanent fastener, or one admitting of easy renewal at any time. Probably nothing will answer the purpose better than a long staple, or bent wire, well embedded in the concrete, being twisted or bent at the end to prevent extraction. Galvanized metal must be used for fasteners, since they are not protected by the concrete. A piece of small flexible wire, about 2 in. in length, threading the staple and twisted several times with a pair of pliers, holds the line wire in position.

MOULDING AND CURING POSTS.

It is recommended that only so much concrete be mixed at one time as can be used before it begins to harden; but if an unavoidable delay prevents the posts being moulded until after the concrete has begun to set it is thought that a thorough regauging with sufficient water to restore normal consistency will prevent any appreciable loss of strength, though the concrete may have been standing one or two hours. In using a mould similar to those described it is necessary to provide a perfectly smooth and even platform of a size depending upon the number of posts to be moulded. A cement floor, if accessible, may be used to advantage. The moulds when in place are given a thin coating of soft soap, the platform or cement floor serving as bottom of mould being treated in the same way. About $1\frac{1}{2}$ in. of concrete is spread evenly over the bottom and carefully tamped, so as to reduce it to a thickness of about 1 in. A piece of board will be found useful in levelling off the concrete to the desired thickness before tamping. On top of this layer two reinforcing members are placed about 1 in. from the side of the mould. The moulds are then filled and tamped in thin layers to the level of the other two reinforcing members, the fasteners for fence wires being inserted during the operation. These reinforcing members are adjusted, as were the first two, and the remaining 1 in. of concrete tamped and levelled off, thus completing the post as far as mouldings is concerned. To avoid sharp edges, which are easily chipped, triangular strips may be placed in the bottom of mould, along the sides, and when the moulds have been filled and tamped similar strips may be inserted on top. The top edges may be bevelled with a trowel, or by running an edging tool having a triangular projection on its bottom along the edges. The ends and sides of the mould may be removed after 24 hours, but the posts should not be handled for at least one week, during which time they must be well sprinkled several times daily and protected from sun and wind. The intermediate strips may be carefully withdrawn at the end of two or three days, but it is better to leave them in place until the posts are moved. Although a post may be hard and apparently strong when one week old, it will not attain its full strength in that length of time, and must be handled with the utmost care to prevent injury. Carelessness in handling "green" posts frequently results in the formation of fine cracks, which, though unnoticed at the time, give evidence of their presence later in the failure of the posts.

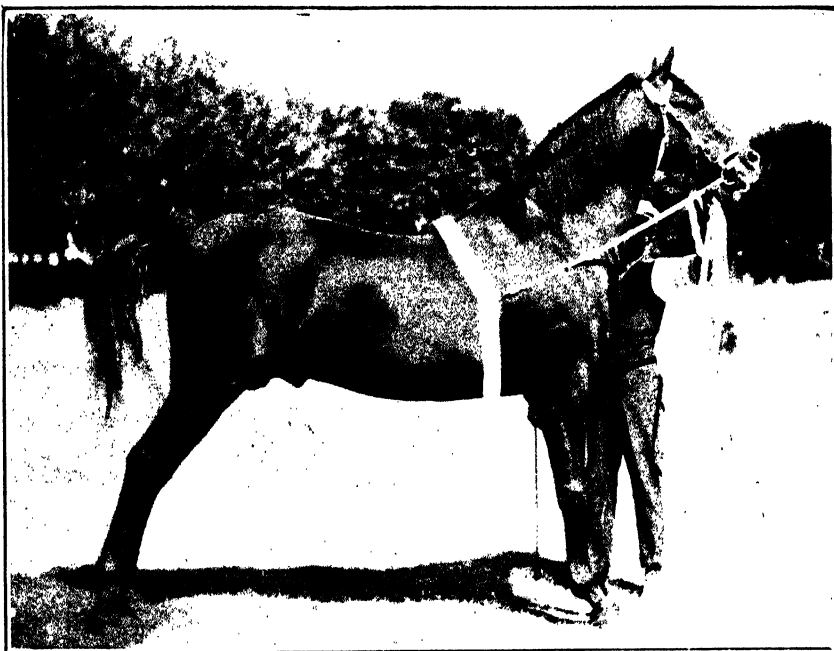
Posts should be allowed to cure for at least 60 days before being placed in the ground, and for this purpose it is recommended that when moved from the moulding platform they be placed upon a smooth bed of moist sand, and protected from the sun until thoroughly cured. During this period they should receive a thorough drenching at least once a day. The life of the moulds will depend upon the care with which they are handled. A coating of mineral oil or shellac may be used instead of soap to prevent the cement from sticking to the forms. As soon as the moulds are removed they should be cleaned with a wire brush before being used again.

The cost of reinforced concrete fence posts depends in each case upon the cost of labour and materials, and must necessarily vary in different localities. One cubic yard of concrete will make 20 posts measuring 6 in. x 6 in. at bottom, 6 in. x 3 in. at top, and 7 ft. long, and if mixed in the proportion of 1 : $2\frac{1}{2}$: 5 requires approximately 1.16 barrels of cement. 0.44 cubic yard of sand, and 0.88 cubic yards of gravel.

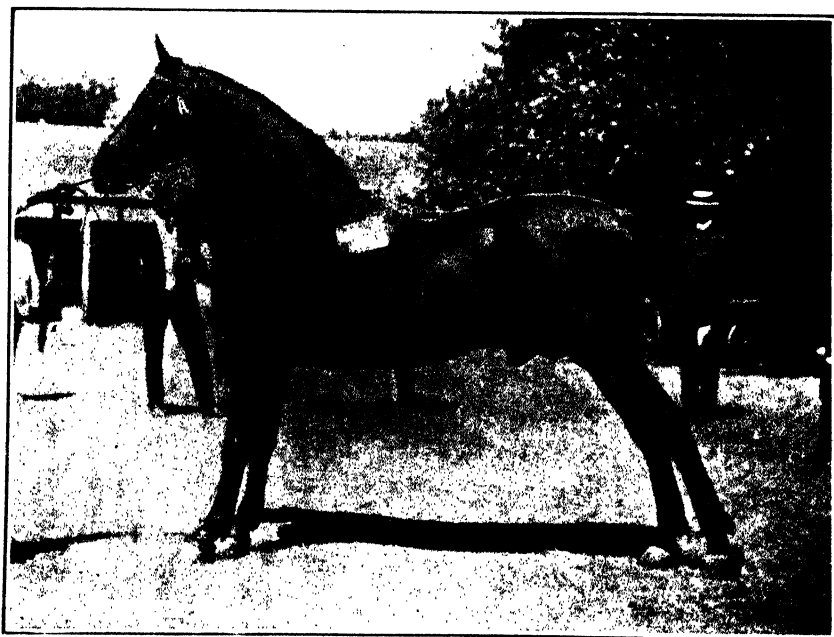
THE AGRICULTURAL SHOW SEASON OF 1910.

SOME OF THE CHAMPIONS.

In the following pages will be found photographs of some of the leading Champions of the principal Colonial Showyards during the Season just closed.



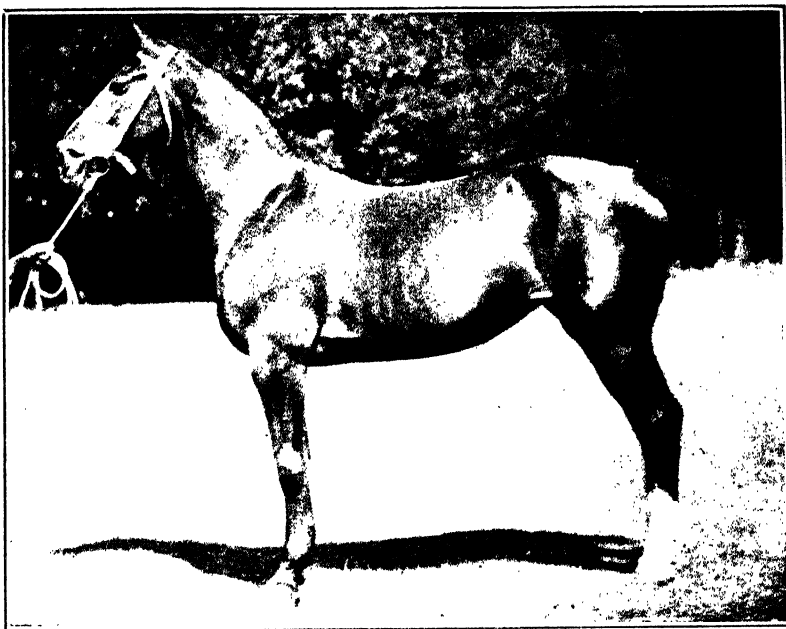
Champion Imported Stallion. Rosebank, "Califa."



Champion Hackney. Rosebank, "Lord Donnington,"

Photos by L. Radcliffe

[Forest Department.]



Champion Imported Mare. Rosebank. "Heacham Minnie."



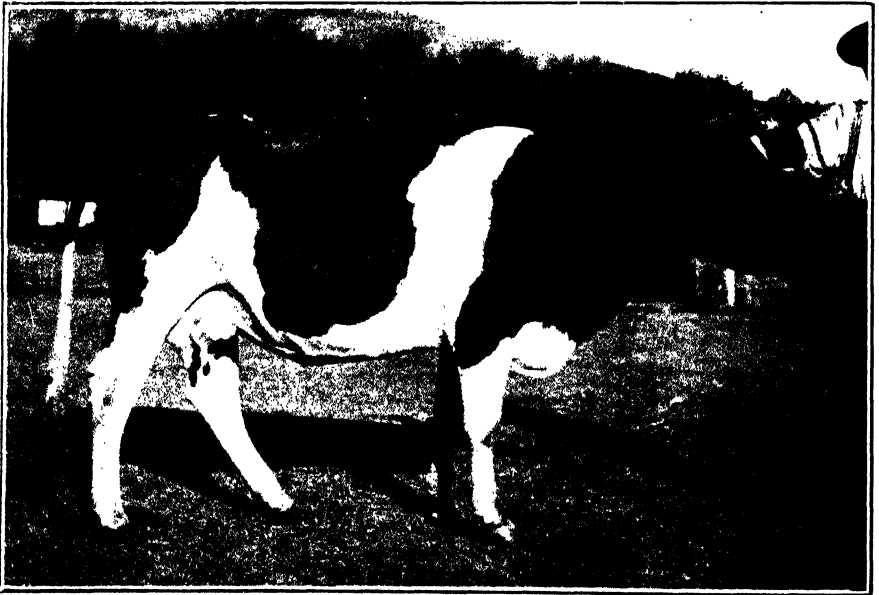
Champion South African bred Stallion. Rosebank. "Silver Tart."

Photos by I. Radclyffe]

[Forest Department.



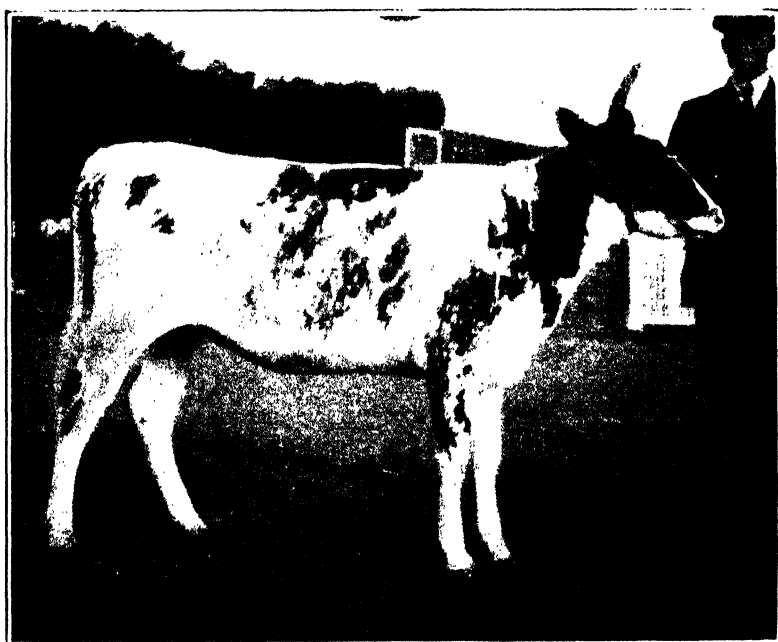
Champion Bull, Heavy Breeds. Rosebank. (Gilchrist).



Champion Cow, Heavy Breeds. Rosebank. (Gilchrist).



Champion Bull, Light Breeds. Rosebank. (A. Barry).



Champion Cow, Light Breeds. Rosebank. (J. Rawbone).



Champion Shorthorn Bull. Port Elizabeth. "Stemgot Duchess Beau."
(Edwards Bros.)



'Handsome Nell,' 1st at the Royal. Never beaten in South Africa.
Champion Port Elizabeth. (J. Rawbone.)



1. Champion Ram, Grahamstown, and 1st Port Elizabeth. (J. E. Hobson). 2. Champion Ewe, and 1st at Graaff-Reinet, Middelburg, (radlock and Port Elizabeth, and 1st at Grahamstown. (A. B. Hobson) 3. Champion Ram, and 1st at Port Elizabeth. (Percy Hobson). 4. Champion Ram, and 1st at Rosebank. (R. Cawood).



1. Champion Fine Woolled Ewe. Rosebank, East London, Grahamstown and Port Elizabeth. (C. Adams & Sons). 2. Champion Robust Woolled Ewe. Rosebank. (J. H. King). 3. Champion Robust Woolled Ram. Rosebank. (J. H. Sieberhagen). 4. Champion Fine Woolled Ram. (J. H. Sieberhagen).
Photos by L. Radtke.

(Forest Department)

AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS.

BEING A COURSE OF LECTURES ON AGRICULTURAL ZOOLOGY, DELIVERED BY DR. J. D. F. GILCHRIST, PROFESSOR OF ZOOLOGY AT THE SOUTH AFRICAN COLLEGE, IN CONNECTION WITH THE TECHNICAL EVENING CLASSES INAUGURATED BY THE SCHOOL BOARD OF THE CAPE DIVISION.

(Continued from page 341.)

INSECTA. (Continued.)

SUB-ORDER II.—HETEROCERA OR MOTHS.

Moths may be distinguished from butterflies by their antennae, which may be feather-like or thread-like, but never clubbed as in the butterflies. Their bodies are somewhat more heavily built, and the wings are not held vertically when in repose. There are many families, and these contain numerous species which are injurious to vegetation. A few of the more important are noted below.

Family I.—Saturniidae.

This family includes many large and striking forms. The wings of some are prolonged into very long tails, and there are often remarkable transparent areas on the wings.

ATHEREA TYRHEA has a large black and white caterpillar, which frequently injures wattle (*Acacia decurrens*) plantations. It does not spin a cocoon, but pupates on the ground.

ATHEREA CYTHEREA has a large and handsome caterpillar, which occasionally defoliates pines in both the East and West of Cape Colony.

Family II.—Bombycidae.

This family may be specially mentioned, as it includes *BOMBYX MORI* (Fig. 103), the caterpillar of which is the well known "Silk-Worm." The insect, originally from Northern China, has been kept in captivity by man for so long a period that it has become quite domesticated, and lost all desire for freedom. Neither the caterpillar nor the adult insect are very striking, but the cocoons formed by the former are of great commercial value. The silk is spun by the caterpillar into a large cocoon

or ball, inside of which it turns into a chrysalis. The rearing of silk-worms is a pleasant and instructive experiment in entomology; the larvae can be purchased in South Africa, fed on leaves of mulberry or lettuce, and the whole process of insect transformation and spinning of silk can be easily observed.

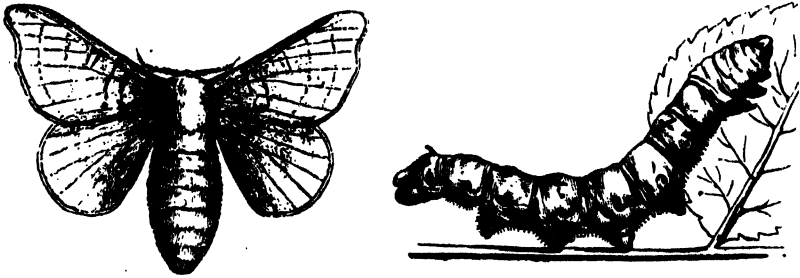


Fig. 103.—*Bombyx mori*, the adult and caterpillar, which is the "Silk-worm of commerce." (Shipley.)

TRILOCHA FICIOCOLA, a South African member of the family, is a small brown moth, which is to be mentioned, not on account of the value of its silk cocoon, but on account of the damage the larva does to fig trees (Ormerod).

Family III.—Sphingidae or Hawk-Moths.

This family includes the "Death's Head Moth," *ACHERONTIA ATROPOS* (Fig. 104), so called from the skull-like markings on its back. This and the distinctly audible cry, which the animal sometimes emits when at rest, have doubtless given origin to certain superstitions regarding it. It is also called the "Bee-Tiger-Moth" as it frequents bees' nests and steals the honey. Campbell in his "Travels in South Africa" says



Fig. 104.—The "Death's Head Moth," *Acherontia atropos*, concerning which there are many superstitions and which steals honey. (Ormerod.)

that the Hottentots aware of this "in order to monopolise the honey of the wild bees, have persuaded the colonists that it inflicts a mortal wound." The belief that it can inflict a severe wound is widely spread amongst colonists, though probably not on account of the persuasive powers of the Hottentots, some of whom at least believe that the mere sight of this insect is fatal. The imago is a large beautiful moth, four to five inches in spread of wing. Bees may be protected from its depredation by making the entrance to the hive too small to admit it, and the larva, which feeds on foliage, including vines, may also be destroyed as well as the chrysalis.

Family IV.—Psychidae.

The larvae of these forms are known as Basket or Bag-Worms as they inhabit a case or bag, which they carry about with them. The case may assume strange forms, from a crude bundle of pieces of wood or leaves (e.g. Fig. 105, A.) to more perfect ones resembling snail shells. These apparently animated bundles of sticks or fragments are looked upon with suspicion by some farmers in South Africa, who believe that they are not without some supernatural import. In some cases the females have no wings nor legs and look like permanent maggots; they never leave their cases, and in them they deposit their eggs, inside their former pupa-skin. The young hatch out there, and it has been suggested, make their first meal on the body of their parent. The males are said to live only a few days.

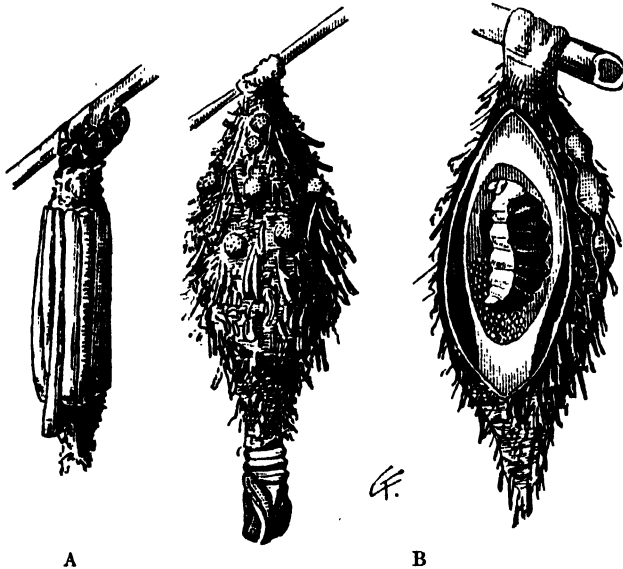


Fig. 105.—Basket or Bag-Worms. (Report of Cape Government Entomologist, 1898.)

ANIMULA (Fig. 105, B.) is a representative of the family common in South Africa. It is a pest of wattle plantations in Natal and is known to Kaffirs as "Hamba-indhlwana" or the insect that goes about with his little house (Fuller).

Family V.—Noctuidae or Owlet-Moths.

These are mostly nocturnal forms, of inconspicuous colour. The eyes are large, and seem to glow with a phosphorescent light. The larvae feed at night on or near the surface of the ground, destroying the roots and lower parts of the stems of vegetation. They are called for this reason "Cut-Worms" or "Mest-Wormen," and often do extensive damage, destroying young mealie plants for instance, by cutting them off just at the surface of the soil. Some of the species, under favourable conditions, increase very rapidly in number. This is the case in *LEUCANIA UNIPUNCTATA*, the larva of which is the notorious "Army-Worm" which commits great ravages on grass and corn in North America. Owing to their obscure habits, they may increase in great numbers without being observed; when all the available food is

exhausted the larvae become gregarious, and migrate in enormous swarms, crossing roads, fences, fields and even pools. On one occasion such an "Army-Worm," *CARADINA EXIGUA*, appeared suddenly at Krugersdorp, entering houses, gardens and streets, the number of the invading army being estimated at 200 millions. "Old Colonists," the local newspaper said, "connect the visitation with the recent fall of hail, and they recall instances when plagues of insects invariably followed a phenomenal storm. It is suggested that the stones carry some germ, which is launched into life when the melting process begins." Yet another explanation was suggested; it was ascertained from the oldest inhabitants that when the black insects arrived the locusts disappeared; locusts were then scarce; "nature abhors a vacuum," the ingenious pressman continues, "and the void, created by the absence of the locusts, is filled by the comparatively innocuous caterpillar."

The Cut-Worms are very destructive to mealies, as they destroy the young plant by cutting it off just under the surface. The two following insects, belonging to the family of the Noctuidae are also destructive to mealies.

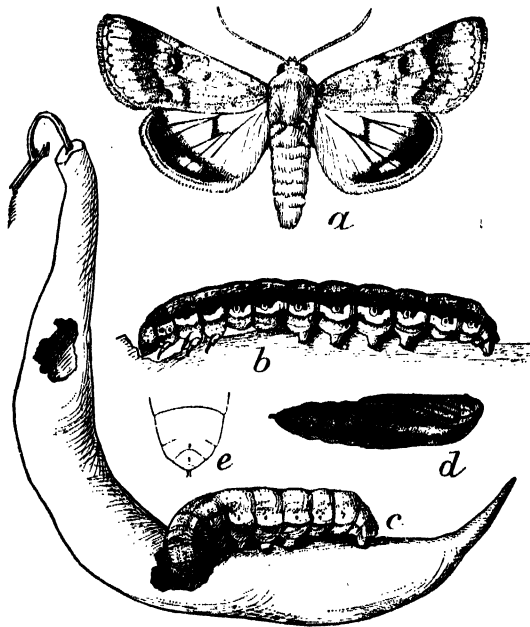


Fig. 106.—*Heliothis armiger*; a, adult moth; b, caterpillar; c, caterpillar attacking pod; d, chrysalis. This is the most troublesome of all S. African Lepidoptera. (Chittenden, U.S. Dep. Agr.)

HELIOTHIS ARMIGER (Fig. 106) is the most troublesome of all South African Lepidoptera; its larva, called the Mealie-Cob-Worm, attacks buds and pods and does extensive damage to mealies, peas, tomatoes and lucerne; it is greenish or brownish in colour, with darker longitudinal stripes.

It is to be distinguished from the Mealie-Stalk-Borer or Mealie-Grub, which is also the larva of a moth, *SESAMIA FUSCA*. This is usually of a pinkish or creamy colour and with small spots along the side. It does much damage to mealies, eating out the core of the growing plant; often a whole field, apparently in a flourishing condition, will suddenly show signs of its fatal attack, and be almost entirely destroyed.

OPHIUZA LEINARDI, the Fruit-Moth, is a common and destructive species. It is not usually seen by day, as it lies hid in grass or dense foliage near fruit trees.

SPHINGOMORPHA CHLOREA, the Night or Dinner-Moth, is a powerful insect, and in general appearance resembles the Sphinx or Hawk-Moth. It is nocturnal and often enters lighted rooms. It is also a pest of fruit trees.

Family VI.—*Pyralidae*.

This family includes a large number of small and moderately sized moths of fragile structure and long legs. Examples are: **GALLERIA MELONELLA**, the large Bees-Wax-Moth which lives in bees nests and feeds on wax, etc.; **EPHESTIA KUEHNIELLA**, the Mediterranean Flour-Moth, which is destructive in flour mills, and **LOXOSTEGE FRUSTALIS** a serious pest to indigenous fruit plants.

Family VII.—*Tortricidæ*.

These are small moths, with rather large wings. Their larvae live in their food, which may be fruit, herbs, or galls. They have also the power of rolling up leaves and of deforming or twisting young branches and buds, from which habit the family receives its name.

CARPOCAPSA POMONELLA (Fig. 107), the notorious Codling Moth is an example of the family. The insect has been known from the time of Pliny, and is now spread over practically the whole of the world. An idea of the destruction it causes may be obtained from a consideration of the fact that in New York State alone it destroys £600,000 worth of apples and pears every year. The adult moth is seldom seen: it is small, being only about three quarters of an inch; the front wings are brownish, crossed by irregular grey lines, and have a brownish spot at the tip, the whole colouring resembling the bark of a tree, from which it is scarcely distinguishable.

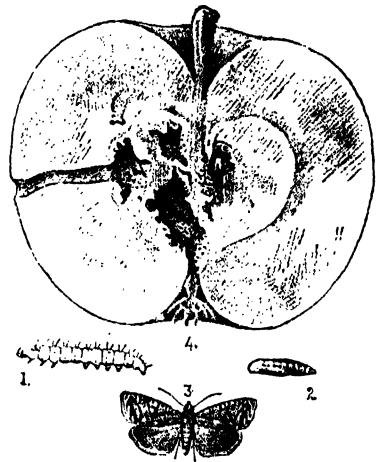


Fig. 107.—The Codling Moth *Carpocapsa pomonella*: 1, larva or caterpillar; 2, pupa; 3, adult moth; 4, an apple showing damage done by larva. (Whitehead.)

Life History of the Codling Moth.

The adult moth lays eggs, which are small, dark and scale-like, in leaves and fruit of apple trees. When the young caterpillar hatches out from these, it may at first feed on leaves, but ultimately enters the apple at the calyx or some point of weakness in the skin. It feeds at the surface, and then begins to travel towards the centre, where it excavates a large cavity, filling it with excrements (fras). This grub is about five eighths of an inch in length, pinkish, and creamy white in colour. When full grown, it eats a tunnel to the surface of the apple, covering the opening with silk and fras. When the time for emergence comes this filling is pushed out, the grub emerges, and seeks a suitable place in trees or on the ground to spin a cocoon. About six days afterwards, it

becomes a pupa, of a yellowish then a dark brown colour. Some time after spinning the cocoon, the pupa pushes its way out, the skin splits, and the moth emerges. In warm countries there is usually more than one generation in a season.

The Codling Moth was first noted at the Cape in 1885, at Graaff-Reinet in 1892, and is now widely spread over the whole of South Africa.

Family VIII.—Tineidae.

These are small moths, with hind wings frequently with long fringes.

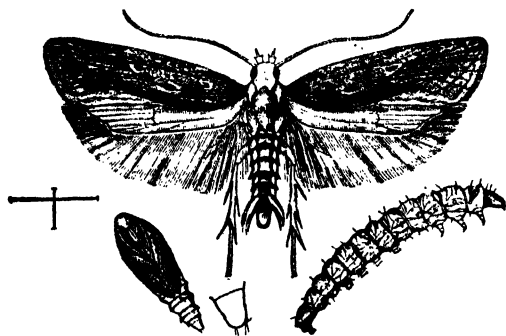


Fig. 108.—The Potato and Tobacco Moth *Galechia solanella*, adult chrysalis and larva, which lustrated damages chiefly stored potatoes. (U.S. Dep. Agr. Year Book, 1898.)

GALECHIA SOLANELLA (Fig. 108), the Potato and Tobacco Moth, causes damage to the tobacco and growing potato plants, but chiefly to stored potatoes, in which it may breed and increase.

GALECHIA CEREALLA, the Grain-Moth, damages stored mealies.

The three species of clothes moths, (TRICHO-PHAGA TAPETZELLA, etc.) are well-known examples of this family, as is also the Diamond-back Moth or Cabbage-Moth, PLUTELLA CRUCIFERARUM,

which has been introduced from Europe into South Africa, and nearly every other country in which the cabbage and other cruciferous vegetables are grown.

Order VII.—Diptera or Flies.

This order is characterised by the possession of *one pair of wings* only. These are membranous, and the posterior pair is reduced to small, slender club-like projections, known as balances or halteres. The divisions of the thorax are all fused together. The mouth parts vary considerably, but are *adapted for sucking*, not for biting. *Metamorphosis is very great*, the larvae, which are footless grubs or maggots, bearing no resemblance to the perfect insects. Some parasitic forms are wingless.

The flies are represented by numerous and varied forms, of which there are 40,000 known species. This is probably far short of the actual number. The eyes are well developed, and the antennae present such a variety of forms, that they serve as a useful basis of classification. Though they have no sting, they can inflict severe wounds by means of their mouth parts. The lancet-shaped mandible and first maxilla are surrounded by a sheath, which may represent the transformed labrum and second maxillae.

The larvae or maggots never have true thoracic legs, though in some there may be locomotory protrusions of the body. In this order metamorphosis has reached its highest development; after the maggot stage is completed, the whole internal organism becomes dissolved into a creamy substance, and from this the totally different organs of the adult are **gradually** formed; so fundamental are the alterations that it is impossible to trace the various organs through the change.

Flies act chiefly as scavengers in the animal world, feeding on vegetable matter, refuse or carrion, and some occur in living animals. They are often serious enemies of man, as they destroy crops by formation of galls, irritate animals by their larvae, but more especially as they harbour various diseases, with which they infect men and animals.

Family I.—Cecidomyiidae or Gall-Gnats.

These are minute flies, the larvae of which damage plants by producing galls or deformations of leaves, stems and roots. The Hessian Fly, *CECIDOMYA DESTRUCTOR*, is in some countries very injurious to cereals, the larva attacking the stem which bends over. If present in South Africa, it has not as yet made its presence felt.

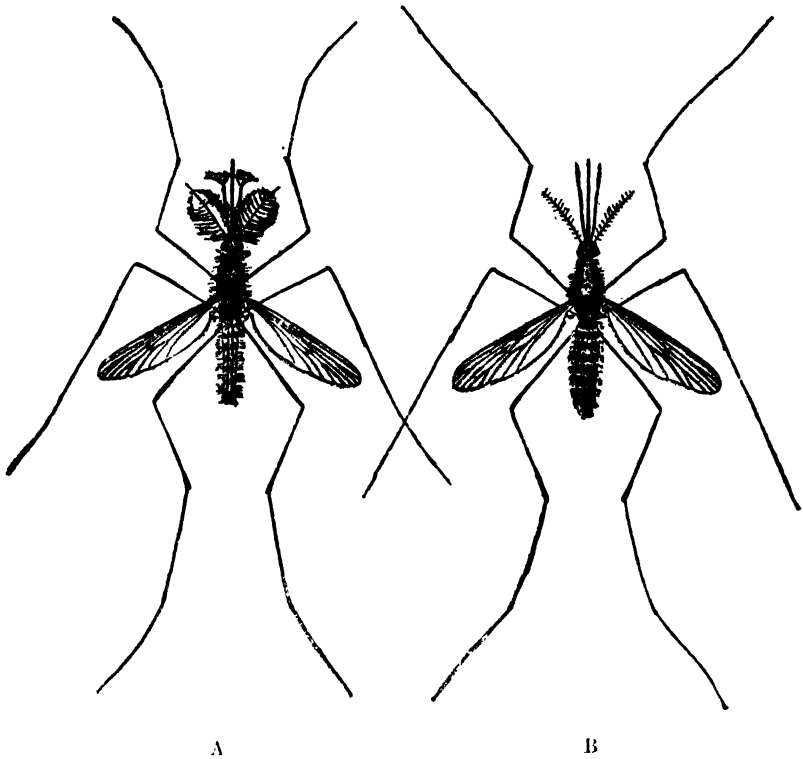


Fig. 109. A Malarial Mosquito, *Anopheles maculipennis* : A, the male : B, the female, which alone bites and conveys malaria. (Howard.)

Family II.—Culicidae or Mosquitoes and Gnats.

This family is characterised by a long proboscis. The most familiar feature of these insects is that some of them, called Mosquitoes, are capable of inflicting a more or less severe wound. They can pierce the skin and suck the blood, injecting at the same time an irritating fluid. The meaning of this is not quite evident, for it is the female alone that bites, and their normal food does not seem to be blood; again the injecting of an irritating fluid seems neither to benefit the insect nor its victim. Mosquitoes have of recent years attracted a great deal of attention as it has been proved that they may carry the germs (the Protozoan

parasite already described) of malarial fever, a discovery which has made it possible to combat this disease. It is a particular genus, *ANOPHELES* (Fig. 109), by which the malarial parasite is conveyed. The eggs of Mosquitoes are deposited on the surface of water in the form of little clusters or rafts. The larvae escape into the water, in which they move about in a jerky fashion, now and again ascending to the surface to breathe air, through a slender tube at the caudal extremity. Hence it is that, if a little oil be sprinkled on the surface of the water forming a thin film, they quickly die. The extermination of the Mosquito, therefore, means the banishing of malaria. Non-biting forms are called Gnats, e.g., *Culex*.

Family III.—Simuliidae or Sand-Flies.

The one genus, *SIMULIUM*, in this family is widely distributed. In North America they often cause extensive mortality among herds of cattle, their bite being followed by death within a few hours. In South Africa *Simulium* ("Black Fly") does not appear to be known as a stock pest, but some species affect poultry.

Family IV.—Tabanidae, Horse-Flies, Clegs or Gad-Flies.

These are well-known blood suckers which attack man and animals. It is the female only that bites and draws blood.

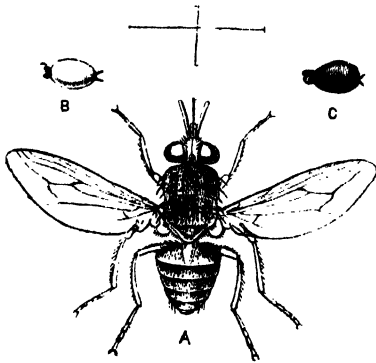


Fig. 110. —*Glossina morsitans*, a Tsetse-Fly, which conveys the Tsetse-Fly disease or Nagana; A, the fly; B larva; C, pupa. (From *The Cambridge Natural History*.)

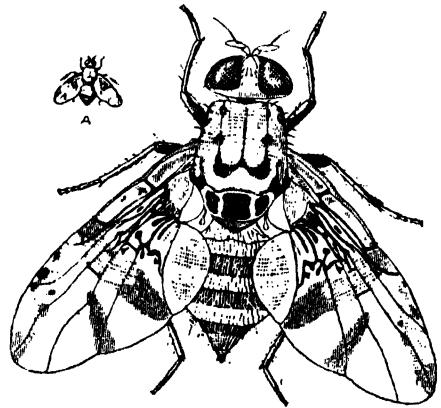


Fig. 111.—The Natal Fruit-Fly, *Ceratitis* sp.; A, natural size. (Fuller.)

Family V.—Muscidae, or House-Flies, Blue-Bottles or Blow-Flies and Tsetse-Flies.

MUSCA DOMESTICA, the House-Fly, lays its eggs in decaying substances, especially horse manure. The eggs are deposited in batches of about 150 and hatch out in a day or two. The larvae, which feed on the refuse, are dirty white footless grubs; they cast their skin twice, and, in about a week, become pupae in the last hardened skin. Under favourable conditions of temperature, they may become perfect flies in another week, though they are thought to pass the winter in the pupal stage. The House-Fly, though annoying to man and beast, has not, until recently, been credited with any graver offence, but there is good grounds for believing that it acts as an agent for the conveying of typhoid germs. Now that its habits and life history are known, its presence like that of the mosquito is by no means an unavoidable necessity.

GLOSSINA MORSITANS (Fig. 110), a Tsetse-Fly, causes the disease known in South Africa as Nagana or Tsetse-Fly disease, while *GLOSSINA PALPALIS*, another species of this fly, conveys the dreaded sleeping sickness, as already noted under the Protozoa.

CERATITIS CAPITA, the Fruit-Fly, has a larva which causes great destruction of fruit in South Africa as elsewhere. An undetermined species occurs in Natal (Fig. 111).

Family VI.—Oestridae or Bot-Flies.

These are mostly large flies. The mouth parts are atrophied in the adult, which therefore never bites; the maggot lives in higher animals (mostly mammals) and may occur in the alimentary canal, in or under the skin, or in the air passages.

GASTROPHILUS EQUI, the Horse-Bot-Fly, lays its eggs on the hairs of the body of the horse, in places which can be licked. This it does very rapidly. The eggs appear to cause some irritation, and the horse licks the parts affected. With the warmth of the mouth of the horse, larvae hatch out, crawl down the throat, and become lodged as "bots" in the left or cardiac part of the stomach. They are pinkish, round larvae, with circles of spines and from three-fourths to half an inch in length; they increase in size for about six months, and, when fully grown, loosen their hold, pass out of the horse, and fall to the ground in which they burrow and become pupae in pupa cases. The eggs fortunately can be easily seen and removed by good grooming of the horse.

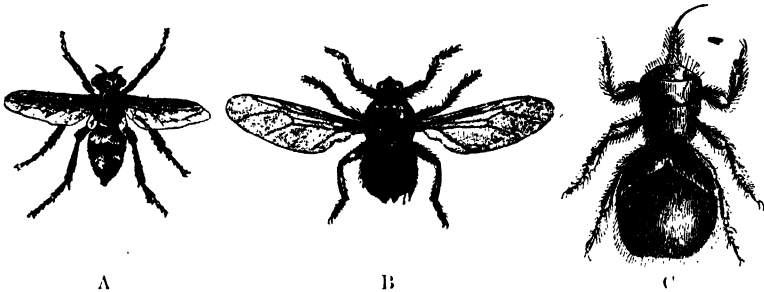


Fig. 112.—A, the Bot-Fly *Hypoderma bovis* the larva of which, the Bot or Ox-Warble burrows in the skin of cattle (Railliet); B, the Ostrich-Fly, *Hippobosca struthionis* (Ormerod); C, the Sheep-Tick, Sheep-Spider or Ked, *Melophagus ovinus*. (Railliet.)

HYPODERMA BOVIS (Fig 112 A), Ox-Warble or Bot-Fly, is a small, hairy, bee-like fly, with yellow, black and red bands on the abdomen. Though it cannot bite, it pursues the cattle, and lay its eggs on or in the skin. The fly is very sensitive to temperature and moisture, and will not enter the shade or pass over running water. It is peculiar that, though the flies do not bite, the cattle become very restive on hearing their buzzing, and often run about as if mad, even plunging down steep places. The larvae hatch out, burrow in the skin and feed on the blood, though producing at first no observable effect. As the bot grows, it acquires bands of prickles, which irritate and inflame the skin, till finally the cavity in which it lies bursts and the larva escapes and falls to the ground where it pupates. The life history of the insect is not fully known, there being a gap between observations of the newly-hatched larva and those found in the skin of the back, and there seems ground for believing that the larva may be taken into the mouth and alimentary canal, from which it may ultimately bore its way to the skin. If so, it is strange that cattle so frantically avoid the non-biting fly but deliberately lick up the eggs, which cause the damage.

OESTRIS OVIS, or Sheep-Nasal-Fly. This fly does not lay eggs, but brings forth young, already in the larval stage. These are deposited at the entrance to the nasal passages of sheep, and they find their way into the frontal sinuses. Sheep, suffering from this, wander about and shake the head, presenting the symptoms of the disease known as "Gid" caused by *Taenia coenurus*, a flat worm. (See under Flat Worms.) Hence this condition is known as "False Gid."

Family VII.—Hippoboscidae, or Horse-Flies, Bird-Flies, Sheep-Ticks.

These are all parasitic in habit, and live on warm blooded animals. Some, like the so-called Sheep-Tick, have no wings. The female produces not an egg but a mature larva or puparium.

HIPPOBOSCA EQUINA, the Horse-Fly, sucks blood; it seldom flies. **HIPPOBOSCA RUFIPES** transmits the organism of a kind of Gall-sickness as already noted. **HIPPOBOSCA STRUTHIONIS** (Fig. 112, B) occurs in the ostrich. Another Hippoboscid fly, **OLFERSIA**, carries *Halteridium* in the pigeon and other birds. **MELOPHAGUS OVINUS** (Fig. 112, C.), the Sheep-Tick, Sheep-Spider, or Ked, is a flat brown insect with no wings. It is provided with hooked claws, crawls about among the wool, and sucks blood. The puparia when deposited are fixed to the wool. They may be destroyed by dipping. This is, of course, a totally different animal from the ordinary tick, which is not an insect at all, as will be shown later.

Family VIII.—Pulicidae or Fleas.

These may be here looked on as a family of wingless *Diptera*, though some regard them as constituting a separate order. The body is flattened from side to side, and the legs are long and adapted for leaping. The mouth parts are adapted for piercing and sucking. The eggs are laid in dust and dirt. Some feed on scurf, hair, feathers and other epidermal structures; they have even been reared artificially on the sweepings of apartments. Cleanliness is therefore an obvious preventative.

PULEX IRRITANS is the Human-Flea. **P. CANIS**, the Dog-Flea, is also found on cats, and **P. AVIUM**, the Hen-Flea, on fowls, amongst which it often causes losses.

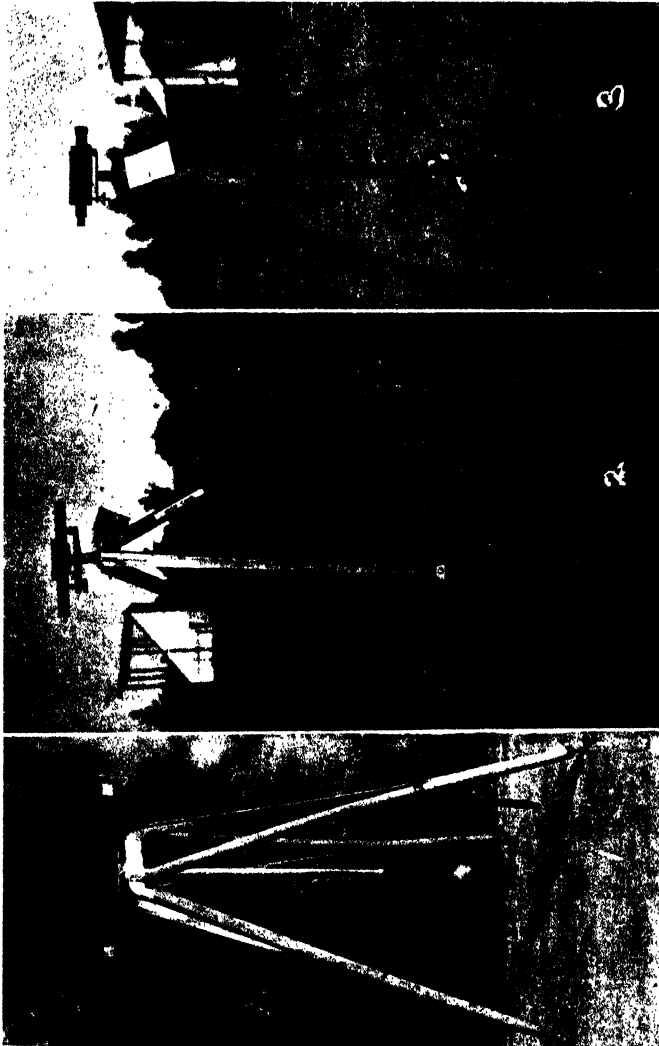
SARCOPSILLA PENETRANS, the Jigger-Flea or Chigoe, originally from tropical America, and now in South Africa, has a peculiar habit. The female penetrates the skin of man or other higher vertebrates, especially attacking hard parts such as the sole of the foot. In this position it becomes distended with eggs, which escape as larvae from the sore so caused, giving rise to ulcers, if it is not removed.

(To be continued.)

FIELD TRIALS OF LAND-LEVEL-TAKING INSTRUMENTS AT MIDDELBURG, C.C.

REPORT OF THE JUDGES.

The Hon. Secretary of the Middelburg (Cape) Agricultural Society (Mr. J. S. Minnaar) forwards us a copy of the Judges' Report on the Field Trials of Land-Level-Taking Instruments held during the recent Show there, also the photographs reproduced herewith. The trials were



1. 1st prize, E. H. Smith, Hellpoort, Grahamstown. 2. 2nd prize, T. Cook & Sons, Cape Town.
3. Highly commended, Parker & Co., Port Elizabeth.

a great success, no less than 22 entries having been received. Though unfortunately, all the instruments were not present at the trials, yet there was a most creditable display. The instrument awarded first prize at Middelburg was also awarded first at Grahamstown.

The Judges were Mr. C. E. Lawford, a well-known civil engineer of the Midlands, and Mr. E. T. Gilfillan, an experienced farmer. Their full report is as follows:—

In arriving at our decisions we have been guided by the principles laid down in the preliminary notice of the trial and the conditions of entry. We have awarded the prize to E. A. Smith (Hell Poort, via Grahamstown). This level consists of a lattice tripod stand, light but strong and firm, having "head" containing "binnacle" rings similar to those on ships' compasses.

The vertical axle of the level head slips into the inner binnacle and engages with a thumbscrew which prevents its falling out when carried and also acts as a clamping screw. This inner binnacle has a downward extension in the form of a metal tube into which telescopes a metal stem carrying near its lower end a heavy plumbob on which gravity acts and thus levels, and keeps the "T" head of the instrument always level.

The tripod need not be level in setting up as gravity, by means of the binnacles, does away with the usual adjustments for observation. The sights are "peep hole" and "cross hair," no glasses being used. A reflector is attached to show the exact position of the "bubble" at the moment of taking the observation. In the event of the instrument being used in a wind, the stem carrying the plum-bob can be lowered by loosening a thumbscrew and the point of the plum-bob will then enter the ground, thus retaining the correctness of the instrument. For simplicity in construction and ease of manipulation we consider it has no rival. The instrument has no adjustments to get out of order.

These advantages together with the fact that the principles on which it is designed are absolutely sound, have decided us in selecting it. We must, however, point out that the tripod is too low to be convenient, the workmanship is poor; and, in our opinion, the construction of this instrument should be placed in the hands of a professional instrument maker. Should this be done we have every confidence in its gaining for itself a first-class reputation as a farm level. Price £3.

We are very highly commending Messrs. Cook and Sons' (Cape Town) exhibit. This instrument has a light but firm and strong tripod of convenient height, well hinged to lower body which is connected with upper body by cone plug and socket, fitted with a milled-headed screw working in hollow ring in plug, to prevent accidental separation and also for clamping purposes. The upper body is a "T" cross head carrying a 12-inch box tube level without glasses. It is hinged in centre with spring buffer in front and a milled-headed adjusting screw at the back.

The "T" head is fitted with an "artificial horizon," to assist in obtaining accuracy in setting up the instrument. The telescope is fitted with a "peep hole" eye piece and a solid point indicator; these being accurately fixed solid by the makers, cannot get out of adjustment without violence. The bubble has the usual adjusting and locking nuts.

We regret they were not substituted by a fixed bubble so that there would be no possibility of its getting out of adjustment with fair usage. This exhibit ran the winning one very close indeed in our opinion. Price, £2 15s.

H. H. Parker (Port Elizabeth) exhibited a very nice little instrument, and it is exceptionally good value for the money. (Price £3 10s.). It is a small pattern of the engineer's and surveyor's usual type, mounted on a tripod with substantially hinged connections between legs and lower body. The connection between the upper and lower body is by means of a cone plug and socket on which the upper body revolves for horizontal motion. We consider this connection incomplete, as being liable to allow the upper body to fall off when carried, and we recommend a

hollow ring being turned in the plug, and engaging with a screw fixed in socket. This would prevent accidental separation of the parts.

The telescope is hinged in front and raised or lowered by means of a milled head screw at back, with spring attached. The indicator is of the solid type, much less liable to get injured than the ordinary "hairs" and requiring less accuracy in cross levelling. It is powerful, but the "push" slide for focussing is inferior to the usual "rack and pinion" worked by means of a milled headed screw as it is more liable to move the instrument out of the level. The bubble has the usual adjusting and locking nuts. We highly commend this instrument. It has a range of usefulness far beyond the requirements of a farm level.

Messrs. Hall Bros., London (Messrs. Philip Bros., Port Elizabeth, agents) exhibit an extremely light instrument on a tripod with telescopic legs, for convenience in packing. These legs are well hinged to lower body. The connection between upper and lower body is a cone plug and socket liable to be disconnected in carrying. A plain ball joint is provided, for rough adjustment, with locking nut. The telescope is hinged in centre with levelling screw in front. The focus is adjusted by means of a "push" slide. The bubble is fixed solid by the makers and is arranged with reflector so that its exact position is visible while taking the observation. For use in unskilled hands we consider this reflector a great advantage. A hair is employed, we would prefer a solid indicator. Price, £4 10s.

Messrs. Philip Bros. also exhibit a very small level on tripod similar to the one by Messrs. Hall, but in our opinion not equal to it. Price, £4 10s.

Mr. Glennie's instrument is identical with the last named in all respects, except that his has a more elaborate tripod stand. Price, £2 17s. 6d., less 5 per cent.

Mr. Hart (Conway) exhibits a tourist telescope with cross hair fixed, a tripod with parallel plates, and three thumb screws with spring. Serviceable, but outclassed. Price, £3.

Mr. Ward (Sleytlerville) exhibits an instrument consisting of a 30-inch masons' level and plumbrule, mounted on tripod. The level has an attachable peephole and cross hair sights, the level being pivoted in centre is adjusted by means of screw and spring attached. Serviceable, but outclassed and somewhat clumsy. Price, £2 15s.—very high in our opinion.

Mr. I. D. Lewis, M.A., A.M.I.C.E. (Cape Town) exhibits an instrument very interesting from a scientific point of view, but to which we do not think farmers will take. It consists of a metal bowl placed on the ground and containing mercury. Into this is placed an upright metal stem which is trued vertically by means of a peep hole and cross hair sights (with adjustments) attached to it. The mercury is used as an artificial horizon. At the upper end of the stem is a reflector (with adjustment) which can be revolved to show objects at a similar height. The stem is supported by being attached to the tripod. Price £ 5.

Messrs. Arthur & Crookshank, Somerset East, exhibit a tripod with large wooden turn table, carrying brackets through which the level head is pivoted. The latter is a long wooden beam, fitted with peep hole and cross hair sight. The level head has an adjusting screw,—a plumbob and line being used as a guide in manipulating. We consider this unsuitable for general use. Price, £2 10s.

Mr. Brider, Middelburg, exhibits what is technically known as an "inclinometer level," showing slopes of furrows, etc., from zero. Very ingenious but not exactly the class of instrument the Society has advertised for. Price, £2.

Mr. Contat (Contat Siding) exhibits an instrument working on the principle that water rises in pipes to its own level when free access is provided. A steel pointed, galvanised iron pipe is driven into the ground as upright as may be. On to it is screwed a horizontal crosshead, also of strong piping having the ends upturned and fitted with water gauge glasses (as used on steam engines). These glasses and the horizontal connecting pipe are supplied with coloured water until it shows, say, at half the height of the glass tubes. A sight is then taken over the surface of the water in the tubes. When standing a few yards behind the instrument and using field-glasses, very accurate reading can be done. The instrument is well made, and its extreme cheapness (10s. 6d. selling price) may commend it to some farmers.

Mr. Spindler, A.M.I.C.E. (Port Elizabeth) exhibits an instrument working on the same principle. This one has an iron tripod stand, a clumsy ball joint and locking nut, carrying a vertical pin on which a large but somewhat delicate crosshead of pipes and glass tubes swivels. We consider this instrument capable of improvement. Price, "under £3."

Mr. Hughes (King William's Town) exhibits another water level on tripod having parallel plates. The upright tubes are metal, carrying "floats" resting on water and having indicators attached. We consider the working of the floats not sensitive enough. Price, £3.

Mr. Kilfoil (Bedford) exhibits a tripod carrying a tin partly filled with oil on which a large float rests, carrying an ordinary builder's level, having peephole and crosshair device in it. Unsuitable in our opinion for general purposes.

By way of general remarks we wish to state that the Society is to be congratulated on the great success of this, its first "Field Trial." The way in which individuals and importing firms have supported the trial is very gratifying, there being 22 entries in all; four exhibits from America failed to arrive in time. The merits of the instruments generally are very good, and if farmers fail to select from among them such as will suit their fancy and requirements, we think they are hard to please.

There were, strictly speaking, four classes of instruments, viz.: the short-range ones of extreme simplicity, which were evidently designed to meet the advertised conditions of the Society, such as Mr. Smith's and Messrs. Cook's. The longer range, with telescope glasses, of which kind Mr. Parker's deserves much praise. The water level class in which we consider Mr. Contat's leads, and the variety class, which has several very creditable exhibits.

Judges: { C. E. LAWFORD, C.E.
E. T. GILFILLAN.

MILK RECORD.

ELSENBURG COLLEGE HERD.

Subjoined is the Milk Record to the 31st March, 1910 :—

Breed and Cow.	Days in Milk.	YIELD IN LBS.		
		During March.	Total to date.	Daily Average.
FRIESLANDS.				
Vera	281	259	6,488	23·1
Violet	250	58	6,287	25·1
Bell	250	395	8,025	32·1
Belladonna	213	289	4,069	19·1
Rose	146	482	4,522	31·0
Daisy	65	793	2,184	33·6
Beauty	65	745	1,818	28·0
Victoria	13	419	419	32·2
JERSEYS.				
Gertie	305	21	6,039	19·8
Gwendolen	269	84	5,189	19·3
Grace	269	62	4,382	16·3
Gladys	255	44	5,109	20·0
Gus	231	246	4,326	18·7
Fanny	219	265	3,667	16·7
Gilliflower	212	198	4,339	20·5
Glee	165	325	3,028	18·4
AYRSHIRES.				
Queen Dot	258	127	5,063	19·6
Lobelia	247	69	5,340	21·6
SHORTHORN.				
Maggie	260	330	6,466	24·8
CROSS.				
Bessie	260	23	8,919	34·3

CO-OPERATIVE EXPERIMENTS—MAIZE

In view of the new opening up of the over-sea market for maize produced in this country, and the increased attention thereby drawn to questions of market and standard, special interest attaches to the question of introducing varieties which will be an improvement on those already founded in the country. One of the difficulties incurred when introducing new varieties of maize is that mealies grown the first year from imported seed do not frequently give the return that is subsequently obtained, requiring, apparently, one or more generations to become acclimatised. Apart from the possibility of introducing improved varieties of mealies, there is a great possibility for improvement of local sorts by selection and cultivation. No doubt this is a very profitable line for any farmer favourably situated to take up, especially at a critical time like the present, when a sudden and general advance is being made and much attention is turned to the subject.

The old custom of broadcasting the seed is fast dying out, and, as is proved by these reports, seed where drilled has given far better results than where sown broadcast. The cost of cultivation is also greatly reduced by drilling.

In addition to the reports published in the *Agricultural Journal* of December, 1907, the following have been received, and are published for general information.

LEAMING EARLY MEALIES.

Previous reports have been very laudatory, and those now received, except three which were destroyed by the grub, speak, on the whole, very well of this variety. It seems safe to recommend it now for general introduction into the country and sowing on a larger scale.

The number of reports received up to date (25th March, 1910) is 103, out of which 47 are good, 45 were negative through various causes, cut-worm, hail, locusts and frost, three only through non-germination, and eleven were of indifferent character.

Grigaland East.

Mr. J. M. Dorning. Sown 30th September. Result: Good. Sown broadcast on irrigated alluvial soil the crop grew well, but was attacked by "stalk-borer" during December. Consider it suitable, and from seed obtained shall give it a further trial.

J. H. Dodd.—Sown 16th November. Result: Good. Although sown late, broadcast and on unirrigated ground, it matured and ripened, giving 50 lbs. from 3 lbs. sown.

C. H. Bradley.—Sown 16th November. Result: Good. It was sown in drills on unirrigated black alluvial soil and harvested in April, giving 84 to 1. Consider it very suitable.

Three failures in this district due to grubs and hail.

Stutterheim.

Mr. F. Bennet.—Sown December. Result: Fair. Is a quick maturing mealie with small grain and large cob. Does not come up to the other varieties of the District.

Paarl.

Mr. L. M. Stella.—Sown November. Result: Good. Sown on sandy land and irrigated, produced 100 to 1.

Stellenbosch.

Mr. J. F. Gauws.—Sown December 4th, 1906. Result: Good. Will give very good results if sown in September or October. A very quick grower, and for table use to be highly recommended.

Mr. H. J. Morkel.—Sown 18th December, 1906. Result: Good. Will answer splendidly as a green forage, being a faster grower than the Colonial Yellow, but not such a profitable producer as the latter.

Mr. A. C. Buller.—Sown 12th December, 1906. Result: Good. The best mealie for the district for cutting green.

Alderman Bros.—Sown November 15th. Result: Good. It matured in two months when sown on sandy soil and irrigated, giving 35 to 1.

Albany.

Mr. S. Ripon.—Sown November. Result: Fair. Consider it will do well, but owing to drought it yielded only moderately. Sown broadcast on irrigated land.

Adelaide.

Mr. Walter Verc. Sown 5th December. Result: Good. Sown in drills and irrigated, it yielded well when harvested in May. Sown on red sandy soil.

Tulbagh.

Mr. C. Plumby.—Sown 28th December. Result: Good. Consider it would have done better if sown earlier. Is a very suitable variety.

Mr. J. C. de Villiers.—Sown 1st November. Result: Indifferent. Put in drills on unirrigated sand soil well manured, it produced only 8 to 1. Not suitable for district.

Vryburg.

Mr. F. Hannay.—Sown November. Result: Indifferent. Owing to very dry weather during the growth only about eight cobs shewed up, but these were destroyed by frost. Consider under more favourable circumstances it would do well.

Mr. J. W. Waldeck.—No date. Result: Good. Grew to a height of 6 to 7 feet, producing fine large cobs. Very suitable to district.

Mr. F. Pearce.—Sown December. Result: Good. Sown broadcast it yielded well, giving 96 to 1. Harvested in April. Season was good and ground received plenty of manure. Splendid for district.

Three results in this district were negative due to drought and late frost.

Kimberley.

Mr. A. Robinson.—Failed through drought.

Bathurst.

Mr. Geo. Gradwell.—Sown 2nd October. Result: Good. Drilled on unirrigated black soil it matured end of February, producing 40 to 1. Suited for district.

Mr. Geo. Mandy.—Sown September. Result: Good. Drilled it produced 30 to 1. Giving it further trial.

One failure due to bad germination in District.

Queenstown.

Mr. J. B. Leach.—Sown 10th December. Result: Fair. Owing to dry weather the yield was not very good; still it is thought a good mealie for district.

Uitenhage.

Mr. C. Holmes.—No date. Result: Indifferent. Do not consider it as good as Golden Beauty, not standing drought so well.

Tembuland.

Mr. Chas. Wheeldon.—Sown December. Result: Good. Weather was dry, which accounted for small yield, 6 to 1. Is a good mealie to sow to procure an early crop after a bad season. Was reaped in May.

One negative result due to the ravages of cutworms.

Swellendam.

Mr. N. J. Steyn.—Sown December 4th. Result: Good. Very good and will pay well even on poor soil. Fast grower. Sowed 4 lbs., yield 103 lbs.

Caledon.

District Forest Officer, Elgin.—Sown December, 1906. Result: Fair. Suitable and will pay. Germination was bad, owing probably to dry weather.

George.

Mr. W. L. Noble.—Sown October, 1907. Result: Indifferent. Failed to germinate with few exceptions. These are looking strong and healthy.

Cathcart.

Mr. P. G. Swingburn.—Sown October 5th. Result: Failure. Destroyed by mealie grub.

East London.

Mr. J. W. Arnold.—Sown November 9th, 1906. Killed by grub and drought.

Elliot.

Mr. G. E. Marillier.—Sown September 20th. Destroyed by the ordinary mealie grub.

LEAMING IMPROVED MEALIE.

Of this variety, another form of the above, only seven reports have come to hand since the 93 mentioned in December last, making 100 in all. Except where injured by insects these mealies seem to have given

much satisfaction. The Leaming seems to be a very strong grower, yielding heavily and is at the same time of good quality and appearance, and one which does well in favourable circumstances, and as the name implies, matures early.

George.

Mr. E. Raubenheimer.—Sown December. Result: Good. Sowed 3 lbs., yield 50 lbs. Good cropper. Seeds large and full. Will decidedly pay.

Villiersdorp.

Mr. A. S. Roux.—Sown August 14th. Result: Indifferent. 4 lbs. sown, 50 lbs. yielded. A poor cropper. Attached by cutworms.

Albany.

Mr. W. G. Rippon.—Sown August 16th. Result: Good. Certainly suitable to district and will pay. Yielded 75 to 1.

Middelburg.

Mr. J. van der Walt.—Sown November 15th. Result: Good. Yield 25 to 1. Suitable and will pay. Three failures due to drought and cutworms.

PEDRICK'S PERFECTED GOLDEN BEAUTY MEALIE.

This mealie appears to be one of the heaviest of croppers, but, like all such, is late in maturing, considerably earlier than the German Yellow in common cultivation in the Colony. It requires ample space and good soils, but, in spite of a few adverse reports, it must be reckoned as quite one of the best varieties. Of this variety 147 reports have been received, out of which 77 were good, some being excellent, 23 poor or indifferent, and 47 failures, 16 of which were caused by excessive drought, 1 by failure of seed to germinate, and in the rest the crop was destroyed either by locusts, insects, floods or hail.

Herbert.

Mr. R. D. Foss.—Sown October 26th, 1906. Result: Good. 4 oz. sown, 43 lbs. yielded. In every way one of the best sorts for our district, and will undoubtedly pay.

Mafeking.

Messrs. Munson Bros.—Sown November. Destroyed by locusts when just flowering.

Richmond.

Mr. N. van der Merwe.—Sown 20th October, 1906. Result: Fair. Sowed 3 lbs., yield 350 lbs. A strong grower and yields very well, but too late a variety for our district.

Hanover.

Mr. H. S. van der Merwe.—Sown December 2nd. Result: Good. Suitable and will pay, but should not be sown later than November. 2½ lbs. sown. 360 lbs. reaped.

Colesberg.

Mr. G. Meiring.—Sown September, 1906. Result: Good. About 5 lbs. sown, 1,200 lbs. reaped. Very suitable and will pay if not attacked by frost.

Molteno.

Mr. C. A. Pope.—Sown Spring, 1906. Result: Indifferent. Not suitable. This variety matures too slowly.

Somerset East.

Mr. H. E. Burnep.—No date given. Failure, owing to drought and scarcity of irrigation water.

Cathcart.

Mr. T. C. Flynn.—No date given. Result: Indifferent. Grew splendidly to over 8 feet, when heavy rainfall caused rot in the cob.

Mr. W. G. H. Flynn.—No date given. Result: Indifferent. Germinated well. Stood 8 feet 6 inches but, owing to too much rain, rotted in the cob.

Mr. A. S. Evans.—Sown October 22nd, 1906. Result: Good. This variety should be sown earlier, say end of September or beginning of October. Many did not ripen properly. 3 lbs. sown, 451 lbs. yielded.

Mr. R. Pell Edmonds.—Sown October. Result: Good. A very fine mealie with long cob and single stalk. Yielded 60 to 1. Drilled on unirrigated ground. One negative. Crop destroyed by birds.

Bedford.

Mr. W. J. Mapham.—No date given. Germinated well, but totally destroyed by grub.

Cape.

Messrs. Clarke and Windsor.—No date given. Result: Good. Good crop. Sowing next year.

Mr. F. Molteno.—Sown September. Result: Good. Quite suited to district, and although no earlier than the other varieties it is a better cropper.

Mr. R. C. Starke.—Sown September. Result: Good. Drilled thinly on well manured ground it produced a fine supply of green fodder.

Mr. H. Reid.—Sown September. Result: Bad. Only grew to 4½ feet high and produced a small cob. Other varieties outgrew it and seemed better suited to the season.

Griqualand East.

Mr. J. H. Dodd.—Sown 22nd November. Result: Indifferent. Seed was sown late, and before crop could mature it was destroyed by frost. Sown broadcast on unirrigated lands.

Mr. A. O. Hulley.—Crops destroyed by hail.

Mr. J. H. Brink.—Sown December. Result: Good. Sown on unirrigated land it produced some cobs over 12 inches long. Consider it a suitable and paying crop.

Mr. W. D. Blaine.—Sown November. Result: Good. Drilled 30 inches apart on light sandy loam and horse-hoed three times it produced 75 to 1. Took 7 months to mature. Good for district as compared with other varieties.

Stellenbosch.

Messrs. Alderman Bros.—Sown 18th November. Result: Good. Sown in drills on unirrigated land it grew 1 foot high and yielded full cobs of medium size.

Paarl.

Mr. W. E. Rooke.—Failed through drought.

Mr. T. K. Brunnette.—Sown October. Result: Indifferent. Do not consider it possible to grow a paying crop of mealies in district.

Mr. P. C. Beyers.—Sown in September. Result: Poor. Sown in drills on manured and irrigated land produced a poor crop. Not suitable for district.

Mr. C. Ackerman.—Sown October and December. Result: Good. Drilled on light loam and irrigated, crop did well, producing cobs nearly 12 inches long. The late sowing was destroyed by grubs.

Vryburg.

Mr. J. C. Hottzhausen.—Sown December. Result: Failure. Although it held on for a long time it ultimately succumbed to drought.

Mr. A. G. Reynolds.—Sown November. Result: Good. Although eaten by hares it yielded 25 to 1. Harvested in April. Splendid mealie and seems to stand drought well.

Three other samples also succumbed to the severe drought.

Tembuland.

Mr. J. L. Dewet.—Sown late in November. Result: Good. It did well sown on stiff soil. Consider it a good variety and am giving it a further trial.

Mr. C. Whittle.—Sown December. Result: Good. Broadcast thinly on unirrigated land it yielded 75 to 1. Harvested in May. Good for district. Recommend sowing in November.

Barkly West

Mr. S. Ventur.—Crop was destroyed by locusts.

Bathurst.

Mr. Geo. Gradwell.—Sown 20th October. Result: Good. Sown in drills on unirrigated clay soil. Despite the drought the crop did well, producing 30 to 1.

Mr. L. Nel.—Sown November. Result: Good. Sown on unirrigated sandy soil it produced 63 to 1. Good mealie for district. No rain fell during flowering period.

One sample was destroyed by cutworms.

Albany.

Mr. W. J. Rippon.—Sown August 16th. Result: Indifferent. 3 lbs. sown, 30 lbs. yielded. Mostly destroyed by mealie bug shortly after they came up. Would do well here in dry seasons and pay. Should be sown about end of September or beginning of October.

Mr. S. Rippon.—Sown November. Result: Indifferent. Owing to drought crop only yielded 5 lbs., and it is difficult to say whether crop is suitable or not.

Mr. H. Norden.—Sown October. Result: Fair. Only produced a fair crop owing to drought, but it appears to be a good mealie for these parts.

Tulbagh.

Mr. J. E. de Villiers.—Sown November. Result: Good. Sown in drills on manured sandy soil irrigated and well cultivated it did well. Consider it a good mealie for the district.

Mr. E. J. M. Schrenk.—Sown October. Result: Good. It germinates early, is a quick grower and good cropper. Drilled on sandy loam and not irrigated it yielded 100 to 3.

Graaff-Reinet.

Mr. F. W. Belligan.—Sown October. Result: Good. Appears a good mealie for these parts as it is a quick grower and matures early.

Mr. J. Meintjes.—Sown December. Was destroyed by frost and snow on 2nd January.

Queenstown.

Mr. J. B. Leach.—Sown 10th December. Result: Good. Sown on irrigated land it produced 90 lbs. from $\frac{1}{4}$ lb. sown. Very well suited to district. One of the finest mealies grown.

Uitenhage.

Mr. C. Holmes.—No date given. Result: Good. Owing to severe drought only few cobs matured which were good. Very suited to district.

Komgha.

Mr. T. A. Newey.—Sown November. Result: Good. Drilled on brown sandy loam. Very suited for district and from appearance is a good export mealie.

Caledon.

Mr. A. S. Roux.—Sown August. Result: Good. Sowed 4 lbs. yield 250 lbs. Suitable and will pay.

One sample failed through drought.

Worcester.

Mr. W. M. Cameron.—No date given. Result: Good. Majority of plants were destroyed by wind and sand storm. Survivors grew luxuriantly, and from appearances should say this variety is suitable for district.

Peddie.

Mr. T. H. E. Tarr.—Sown December. Result: Good. Very suitable mealie as it bears plenty of grain and little cob.

Three samples sent to this district were killed by drought and cutworms.

Elliot.

Mr. E. Gray.—Sown October, 1906. Result: Good. One of the best for the district if sown in October, and will pay. 3 lbs. sown, 460 lbs. yield.

EARLY YELLOW CANADA MEALIE.

Some hesitancy was shewn in previous reports with regard to this mealie, and this is fully justified by those which have since come in. Although yielding well in a few instances, this mealie has generally succumbed to some form or another of pest. Mealie stalk borer, surface caterpillar, rust, locust, drought, frost, spring hares, guinea fowl, have all been mentioned as causes of failure, from which it may be assumed that the mealie is too delicate to be of any avail here.

In all 47 reports of this variety have been received, of which 18 are good, 4 indifferent and 25 failures.

Stellenbosch.

Mr. J. F. Gauws.—Sown December. Result: Good. Suitable and will certainly pay, but ought not to be sown later than September.

Mr. H. J. Morkel.—Sown December, 18th. Result: Good. Answers splendidly as a green fodder crop as it grows quickly, but is not such a good grain producer as other varieties.

Beaufort West.

Mr. W. G. Rice.—Sown December. Result: Negative. Was killed by frost. If sown earlier should prove a profitable cropper.

Murraysburg.

Mr. E. Bussvalen.—Sown December 18th. Result: Fair: Produced a crop of 40 to 1. Will pay to grow as fowls' food but doubt whether it is suitable to district.

East London.

Mr. J. W. Arnold.—No date given. Three trials all destroyed by grubs.

Elliot.

Mr. G. E. Marillier.—Sown 20th September. Result: Failure. Owing to the excessive drought only a few seeds germinated. Judging from these should say it was suited to district.

Graaff-Reinet.

Two samples sent were destroyed by locusts.

Fort Beaufort.

Mr. W. W. Painter.—Sown January 5th. Result: Indifferent. Do not consider suitable as it does not grow tall enough.

King William's Town.

A sample sent to this district was destroyed by grubs and stalk-borers.

Tulbagh.

Mr. N. J. Rooke.—No date given. Result: Good. Sown on rich alluvial river land, irrigated and well cultivated it gave a good return. Grows as well as any variety in the district.

Mr. J. W. Basson.—Sown April. Result: Failure. Destroyed by grubs.

Caledon.

Mr. A. P. Lotter.—Sown November. Result: Indifferent. Not suitable to district.

Humansdorp.

Mr. J. W. Damant.—Sown August. Result: Failure. Destroyed by stalk-borer. May be suitable if sown earlier.

Middelburg.

Mr. U. von Bratt.—Sown early December. Result: Indifferent. More suited to fodder than for production of grain, as stalks are thin. Not thought suited to district. Sown too late.

Two samples sent to this district were poor owing to summer drought.

Mr. E. le Roux.—Sown October. Result: Good. Sown in drills on unirrigated land it did well. Can recommend it as an early crop for the district.

Cathcart.

Mr. F. Pfuhl.—Sown December. Result: Fair. Sown in drills and not irrigated it did well considering the season. It was the only variety to produce cobs.

Albany.

Mr. E. W. Howarth.—Sown October. Result: Indifferent. Yielded about 5 to 1, sown broadcast on unirrigated virgin soil. Matured in about 3 months. Not suited to district.

SNOW WHITE DENT MEALIE.

Opinions differ very decisively with regard to this mealie. One experimenter considers it not a good yielder when it returns 75-fold, another calls it a good crop and got a return of 25 for 1. It is evidently best suited to our warmer parts with a long growing season, but is susceptible to damp weather. 128 reports have been received up to date, 49 of which have been favourable, 41 bad and indifferent, and 38 failures due to drought and sundry other causes.

George.

Mr. E. Raubenheimer.—Sown early in November. Result: Good. Sowed 3 lbs., yield 75 lbs. Very good and will certainly pay. Good cropper.

Colesberg.

Mr. G. A. Louw.—Sown October 19th. Result: Indifferent. 2 lbs. sown, 150 lbs. yield. Not suitable. Too slow and not a good yielder.

Mr. G. Meiring.—Sown September. Result: Good. Suitable and will pay if no early frosts occur.

Mr. J. A. Venter.—Sown December. Result: Good. Produced 100 to 1. Sown in drills on alluvial soil and irrigated. Very suitable to these parts. Matured in four months.

Queenstown.

Mr. R. H. Frost.—Sown 12th December. Result: Indifferent. Sown in light and irrigated it produced at the rate of 4 bags per acre. Not suited to district taking too long to mature.

Hanover.

Mr. H. B. W. Lindsay.—Sown 11th November. Result: Indifferent. Crop did well until flowering stage when, owing to continued drought, it failed.

Mr. H. S. van der Merwe.—Sown 2nd December. Result: Good. 2½ lbs. sown, 324 lbs. yield. Suitable and will decidedly pay. A good many seeds failed to germinate, quite 40 per cent. Otherwise the yield would have been doubled.

Vryburg.

Mr. G. D. Smith.—Sown November, 1909. Result: Good. Broadcast on sandy loam produced 30 to 1. Harvested middle of May. Very suited to District. Very good season.

Mr. D. G. Hartman. Sown 16th December, 1908. Failed throughout.

Richmond.

Mr. C. T. Eckard.—Sown November, 1908. Result: Indifferent. Owing to drought no crop reaped although it grew well.

King William's Town.

Mr. G. G. Genis.—Sown February. Destroyed by frost.

Stellenbosch.

Industrial School.—Sown October. Result: Good. Drilled on manured ground and irrigated it yielded 150 to 1. Very suited.

Herbert.

Mr. R. D. Voss.—Sown November, 1906. Result: Good. Sowed 4 oz., reaped 32 lbs. Suitable and will pay, but a yellow mealie is generally preferred.

Stutterheim.

Mr. Alex. Michael.—Sown November. Result: Good. Drilled on irrigated ground proved very suited to district.

Knysna.

Mr. H. J. Roberts.—Sown August. Result: Good. Proved very suitable, being a clean vigorous grower and good cropper. Drilled on manured sandy soil.

Cathcart.

Mr. T. C. Fynn.—No date given. Grew well till nearly ripe, then rotted in the cob owing to too much rain.

Mr. C. Kettles.—Sown November, 1908. Result: Bad. Cobs developed very badly, which may be due to high altitude. "Not suited to us."

Bathurst.

Mr. L. Nel.—Sown November, 1908. Result: Fair. Mealies grew well until flowering stage. Owing to drought cobs did not form.

Dordrecht.

Mr. E. A. Thornhill.—Sown December 11th, 1906. Suffered from rust, killed by frost before ripe.

Molteno.

Mr. C. A. Pope.—Sown Spring, 1906. Result: Indifferent. Not suitable for the district. Takes too long to mature in this cold climate.

Griqualand East.

Mr. G. F. Blaine.—Sown November, 1908. Result: Good. Drilled 18 inches apart on unirrigated sandy loam it produced 209 from 1. Cultivated three times. Harvested June.

Mafeking.

Messrs. Musson Bros.—Sown November, 1906. Thrived well, and was a very good hardy plant until destroyed by locusts.

Bedford.

Mr. W. J. Mapham.—No date given. Completely destroyed by grub.

East London.

Mr. John McNeilage.—Sown October 8th, 1906. Damaged by rain. Soured off.

Tembuland.

Mr. W. C. Wiggill.—Sown end of October, 1906. Result: Good. A most valuable mealie. The grain is long and deep, leaving the cob very small after having been stripped. Consider it quite an acquisition to the district.

Mr. P. C. le Roux.—Sown September, 1909. Completely destroyed by locusts.

CINQUANTINO MEALIES.

Much liked by the trade on account of its small size, many growers seem to misunderstand this point and expect it to be a heavy cropper. With a mealie of such extreme earliness it is impossible at the same time to secure a heavy yield. On the other hand, it possesses great value as green fodder if not allowed to ripen. Cinquantino mealies, accidents and grub apart, did well last season. It is a noticeable feature that this mealie has done much better far inland than along the coast, and it is exactly suited to the shorter seasons of the higher parts of the country. This mealie has been the most widely distributed of any variety imported, and to date 206 reports have been received, of which 83 have been favourable, 51 of an indifferent and poor nature and 72 have been failures due to sundry causes.

Humansdorp.

Mr. F. W. Damant.—Sown September. Result: Good. Sown on loose friable soil, manured with guano and irrigated, it grew well but suffered from drought. If sown earlier should pay.

Cape.

Mr. F. J. Mostert.—No date given. Result: Bad. Does not yield half as much as the ordinary mealie, and therefore not favourable for this district.

Messrs. Clarke and Windsor.—No date given. Result: Good. Splendid crop, sowing next year.

Vryburg.

Mr. C. C. Warmenley.—Sown January. Result: Negative. Sown too late and caught by frost.

Mr. F. Pearce.—Sown December. Result: Indifferent. Mealie too small, and it does not seem to answer in this district.

Mr. W. H. Sargent.—Sown January 3rd. Destroyed by locusts three weeks after germinating.

Tembuland.

Mr. Philip F. Osborne.—Sown November 20th. Result: Good. Did well, but would do better if sown earlier. Only produced 15 lbs. seed but was badly attacked by "stalk borer."

Mr. S. G. Adams.—Sown December 12th, 1906. Result: Good. Quite suitable and will pay well.

Mr. W. S. Warner.—Sown October. Result: Good. Would be a good crop to sow when rains fall too late to put in other varieties owing to its maturing quickly.

Mr. J. N. Miller.—Sown September. Result: Negative. Destroyed by cutworms.

Mr. A. F. Dold.—Sown December. Result: Poor. Badly attacked by grubs and rust. Yield very poor. Do not consider it worth growing.

Mr. E. D. Clarke.—Sown 12th December. Result: Good. Sown thickly broadcast on dry land it was harvested 15th March and gave 15 to 1. Consider it a suitable and paying crop.

Graaff-Reinet.

Mr. J. Meintjes.—Sown December. Result: Good. Sown broadcast and irrigated it matured in one month to sufficiently withstand a frost on 2nd January. Good mealie for district where summer is so short.

Stutterheim.

Mr. Paul Horn.—Sown October. Crop destroyed by "stalk borer" when in flower.

Cathcart.

Mr. W. F. Hall.—Sown September. Completely destroyed by cutworms.

Mr. A. S. Evens.—Sown October 22nd, 1906. Result: Good. Yield 375 lbs., 3 lbs. sown. Yield not so heavy as the Golden Beauty owing to the seed being so much smaller, and the drill not placing them so evenly

apart, many places a little too thick. Would be good for times of drought in the Spring, and sown when summer rains set in. Could be sown early in December in this district.

Mr. P. J. Froneman.—Sown October 1st. Result: Indifferent. Attacked by grubs when about 4 inches high. Not suitable to the district.

Bathurst.

Mr. Harold Richardson.—Sown December, 1906. Result: Good. Sowed 5 lbs., yield 200 lbs. Very suitable for this part of district. Comes up quickly and stands drought well.

East London.

Mr. R. N. Marillier.—Sown December, 1906. Result: Bad. Did not thrive at all, although mealie crops were exceptionally good this season. Had not ripened when frost came in the first week of May. Very late for our district.

George.

Mr. J. A. Moore.—Sown October 21st, 1906. Result: Indifferent. Will do well if sown earlier. Owing to drought the moths destroyed them completely.

Caledon.

Mr. A. P. Lotter.—Sown November, 1906. Unsuitable. Very small yield.

Richmond.

Mr. N. van der Meewe.—Sown October 20th, 1906. Result: Good. The earliest mealie of 8 varieties tried. Could easily be sown on land after oat or barley crop has been reaped, and still be ripe in time for soil to be available for the usual ploughing. Will pay fairly well, especially as a secondary crop. Yield 325 lbs. from 3 lbs. sown.

Colesberg.

Mr. G. A. Low.—Sown 17th October, 1906. Result: Indifferent. 2 lbs. sown, yield 125 lbs. Being such a small mealie it required a great deal of labour. Useful to sow if rains come too late for any other varieties.

Murraysburg.

Mr. E. Bussien.—Sown 31st December. Attacked by locusts and destroyed.

Dordrecht.

Mr. E. A. Thornhill.—Sown 11th December, 1906. Result: Good. 3 lbs. sown, yield about 200 lbs. Thinned out by grubs and attacked by locusts at an early stage. Cobs so small that they pass through the ordinary sheller too easily. Grain small and therefore good for chickens and general feeding purposes. Being a quick grower especially adapted to this district, where the growing time is often very limited through frosts coming late and early and want of rain to start planting.

Middelburg.

Mr. J. van der Walt.—Sown November 15th, 1906. Result: Good. Sowed 3 lbs., yield 30 lbs. An excellent mealie for all dry parts. Will pay well.

Aliwal North.

Mr. U. G. Hards.—Sown October 17th. Result: Fair. Completely destroyed by locust just before ripening. Very quick grower and stood out well, bearing a good crop of cobs. Excellent for poultry use.

Mr. N. J. Steyn.—Sown 4th December, 1906. Result: Good. 6 lbs. sown, 193 lbs. yield. Good for early sowing and thereby escaping the locusts. Grows well in sandy soil. Grain small, good for fowls, horses, sheep, etc. Will pay.

Venterstad.

Mr. L. Fossati.—Sown December, 1906. Made a fair growth, then destroyed by hail.

Barkly West

Mr. G. H. Collen.—Sown February, 1907. Result: Indifferent. Sowed 7 lbs., yield 72 lbs. Attacked by locusts when very young. Not suited to this district, seed too small.

Elliot.

Mr. E. Gray.—Sown October 15th, 1906. Result: Indifferent. 3 lbs. sown, yield 150 lbs. Does not suit the district.

Victoria West.

Mr. J. J. de Clerk.—Sown end of December, 1906. Result: Good. 10 lbs. sown, 400 lbs. reaped. Attacked by locusts, losing at least two-thirds. Will decidedly pay. Being such a quick grower, if sown early in December after reaping the early crops two crops can be got.

Maclear.

Mr. Fred. G. Hayes.—Sown December, 1906. Result: Indifferent. Not suitable. Nearly all destroyed by grubs when young.

Kimberley.

Mr. A. Robinson, F.C.—Sown December. Result: Good. It matured in two months and gave 16 to 1. Drilled and irrigated on sandy loam. When crop was harvested more was sown, February 14th, and gave 43 to 1 when reaped May 8th. Was sown broadcast and not watered. This variety fills a long felt want and can be sown late, should the first crop fail.

Paarl.

Mr. L. M. Stella.—Sown September. Result: Good. Reaped 5 to 1. Sown in drills on dry land. Think it very suited as dry weather was experienced throughout the growing period.

Mr. F. C. Smith.—Sown November. Result: Good. Cut stalks and made hay, also procured 150 lbs. seed from 5. Would be suitable if we had a little more rain. Stood drought well.

Mr. J. Bresler.—Sown September. Result: Good. Other mealies only grew 1 foot high due to drought. Under similar circumstances this mealie produced 5 to 1. "Very good."

Calvinia.

Mr. J. G. van Dijk.—Sown November. Result: Good. Matured in 72 days. Stands drought well and is worthy of further cultivation in our dry districts. Yielded 12 to 1.

Mafeking.

Mr. E. J. Powell.—Sown December. Result: Good. Matured in 80 days producing 28 to 1. Sown on black loam in drills. Suitable for district.

King William's Town.

Mr. A. C. M. Tainton.—Sown December. Result: Indifferent. When sown broadcast on dry land it only yielded 7 to 1. Do not consider it a payable crop although it grows well.

PRIDE OF THE NORTH MEALIE.

This variety is practically new to the Cape Colony. It is a yellow variety tapering to the embryo, similar to the White Horse Tooth. It is early and should prove useful to the more inland districts where the summer is short. Thirteen reports have been received to date, of which five are good, three bad and five failures; two due to drought and the rest to insects.

Vryburg.

Mr. J. C. Holtzhausen.—Sown 10th December. Failed through drought.

Mr. C. C. Vermeulen.—Sown January. Owing to late sowing it was killed by frost.

Paarl.

Mr. P. J. Hugo.—Sown October. Result: Good. A good cropper and quick grower. Sown on irrigable lands.

Cape.

Mr. H. C. Starke.—Sown September. Result: Good. Gave a good growth of green food which was cut for cattle in December. Quite suited for this purpose for the district.

Mr. H. Reid.—Sown September. Result: Bad. Only attained a height of 4 feet 6 inches, whereas local mealies grew much taller and gave better results under same conditions.

Ceres.

Mr. W. Harcourt.—Sown November. Result: Indifferent. Drilled and irrigated it did badly, being far inferior to other varieties of white mealies.

Mr. A. J. Erterhuizen.—Sown November. Result: Bad. Drilled on sandy soil and irrigated it did badly. Does not seem suited to this class of soil.

Peddie.

Mr. H. Wesson.—Sown October. Failed through drought.

Mr. Ambrose Tarr.—Sown August. Totally destroyed by "stalk borer."

Mr. T. H. E. Tarr.—Sown December. Result: Good. Consider it suitable for district. Sown broadcast on dry sandy land.

Barkly West.

Mr. S. Vertue.—No date given. Result: Good. Did well and was ripe early.

Mr. L. B. Webber.—Sown August. Result: Good. Sown thinly in drills and kept clean it yielded 33 to 1, ripening in 5 months and 15 days from date of sowing. Consider suited to district.

WHITE CAPE YELLOW DENT MEALIE.

As its name implies, it belongs to the Dent varieties, is small in size, longer than broad tapering to the embryo. It is compact on cob. Is a light lemon colour with a white cap from which its name is derived. Fifteen reports have been received to date, seven of which are favourable, 3 bad or indifferent and 5 negative, one of which was caused by excessive wet and four by drought.

Malmesbury.

Mr. R. Uys.—No date given. Failed through drought.

Cathcart.

Mr. R. Pell Edmonds.—Sown November. Failed through drought.

Mr. C. Kettles.—Sown November. Result: Good. Can strongly recommend this mealie, it being a strong grower, good cropper and early.

Mafeking.

Messrs. de Kock and Erskine.—Sown December. Result: Bad. Weather conditions were unfavourable to any crop. It does not appear to be drought-resistant.

Mr. E. Kinsley.—Sown November. Result: Negative. Grew well but was killed by too much rain.

Mr. E. J. Powell.—Sown December. Result: Good. Drilled on black loam without irrigation it produced 34 to 1. Suited to district.

Vryburg.

Mr. F. S. Burt.—No date given. Result: Negative. Grew well but was ultimately killed by drought.

Mr. W. C. Hunt.—Sown November, 1908. Result: Good. Sown thinly on rich soil broadcast and irrigated it produced 280 to 1. Harvested in May. Watered twice a week. Sample sown on dry black loam produced 12 to 1. Fair rainfall.

Clanwilliam.

Mr. W. W. Smuts.—Sown October. Result: Indifferent. Drilled thinly on irrigated manured sandy loam. It only gave 20 to 2½. Weather against the trial of new crops.

Worcester.

Mr. W. M. Cameron.—No date given. Destroyed by hot wind and sand storm when 6 inches up.

Bathurst.

Mr. L. Nel.—Sown November. Result: Good. Drilled on unmanured sandy soil it grew well until blossoming period, when dry weather set in. Reaped 75 from 2.

Colesberg.

Mr. J. A. Venter.—Sown December. Result: Good. Yielded 100 to 1. Was sown on alluvial soil and irrigated. Good for district.

Mr. A. J. Zwart.—Sown September. Result: Fair. Broadcast on irrigated slightly brak red karroo soil it yielded 50 to 1. Not considered suitable, too slow. Harvested in March.

Victoria East.

Mr. A. J. Smith.—Sown September. Result: Good. Seems to stand drought well.

King William's Town.

Mr. Geo. Kilfoil.—Sown September. Result: Bad. Drilled thinly it only produced 2 to 1. Wet season. Attacked by borer when coming into flower. Harvested April. Not suited to district.

WISCONSIN WHITE DENT MEALIE.

When this mealie was first brought before the farming community they were greatly prejudiced as at that time the yellow mealie was in greater favour, but of late years things have altered, and with the export trade opening up for white mealies there is a bigger demand. It was first reported on as far back as 1905, but owing to the few reports received no results were published. To date more reports have come to hand and something definite can be seen. As with other seeds they require to become acclimatised to a certain extent when better yields will be obtained. The period of trial of this mealie has been a very dry one, which accounted for many failures. To date 26 reports have been received, of which 10 have been failures, 11 of a favourable nature and five of a bad or indifferent character.

The detailed reports will shew the general opinion with regard to this variety.

Piquetberg.

Mr. J. Leonhardt.—Sown October 31st, 1905. Result: Fair. Is suitable and will pay if irrigated.

Paarl.

Mr. F. Weitz.—Sown August, 1905. Result: Bad. Neither suitable nor will it pay.

Hanover.

Mr. H. S. van der Merwe.—January 2nd, 1905. Result: Good. Both suitable and will pay. A little later than local varieties.

Mr. H. B. W. Lindsay.—11th November, 1907. Result: Indifferent. Crop did well until water gave out, when, owing to continued dry weather, it failed.

Cape.

Mr. F. Rahmer.—Sown November 28th, 1906. Result: Good. Suitable and will pay. Not as good as Thoroughbred White Flint.

Vryburg.

Messrs. Cardwell and Harper.—Sown 27th December, 1906. Result: Good. "Am rather impressed with this mealie. It is early and good."

Mr. C. G. Dennisen.—Sown 1st January, 1907. Result: Good. Ripe 27th March. This mealie yields well.

Mr. A. H. Hartman.—Sown November, 1908. Killed by drought.

Victoria East.

Mr. Joseph Amos.—Sown December, 1906. Result: Fair. As it was sown late did not give as good results as might have done if sown earlier.

Molteno.

Mr. A. Francis.—Sown October 15th, 1906. Result: Good. Consider this mealie very profitable to grow. Compares well with our best varieties. Average 6 feet high.

Mr. C. A. Pope.—Sown October, 1906.—Result: Indifferent. Suffered from severe hailstorm and locusts. Did rather better than either Golden Beauty or Snow White Dent, but does not compare with the small Kaffir mealie for this climate.

Bedford.

Mr. W. J. Mapham.—Sown 29th October, 1906. Result: Indifferent. Seems more subject to ravages of grubs than our local varieties. From those left should say it was rather late.

Bathurst.

Mr. E. R. Timm.—Sown 2nd November, 1908. Result: Indifferent. Sown in drills 2 feet each way on dry land. Should say that this variety would answer in district. Yield 32 to 1. Trying it again.

Griqualand East.

Mr. J. H. Dodd.—Sown 16th November, 1907. Result: Fair. Owing to late sowing it did not mature, being nipped by frost. Consider it will be a good mealie if sown earlier.

Mr. R. Lake.—Destroyed by early frost.

Fort Beaufort.

Mr. Walter Vice.—Sown 5th December, 1908. Result: Good. Sown in drills and irrigated it grew well, yielding 100 from 2. Sown 15 days after Hickory King it manured 14 days earlier. Consider it a good mealie for late sowing.

Kimberley.

Mr. A. Robinson.—No date given. Result: Good. These mealies, in spite of hot winds and drought, grew well and yielded 27 to 1. Quite the best mealie for general purposes in this country.

Maclear.

Mr. O. A. Hulley.—Sown December. Destroyed by hail.

Queenstown.

Mr. J. B. Leach.—Failed through drought.

Hay.

Mr. J. Brewer.—Failed through drought.

East London.

Mr. R. Bryson.—Destroyed by cutworms.

Uitenhage

Mr. F. Hutchinson.—Failed through drought.

THOROUGHbred WHITE FLINT.

This mealie as already reported on, was not in much favour when first distributed, as it is a white variety, but since the report of 1907 it had steadily grown in favour. It is one of the chief varieties grown in the Oathcart and surrounding districts, and is known there as the "Eight row," by other names in various parts of the Colony. Previous reports amount to 30, and with those lately received brings the total to 57, of which 24 are in its favour, 11 unfavourable and 22 have been failures due to drought, grubs and locusts.

Fryburg.

Mr. W. H. Sargent.—Sown January, 1909. Eaten by locusts.

King William's Town.

Mr. H. Dredge.—Sown December, 1907. Result: Good. Suitable for district and will pay. Attacked by "stalk borer" when flowering.

East London.

Mr. J. Slement.—Sown 14th December, 1906. Failed through drought.

Mr. S. T. Dredge.—Sown 17th December, 1907. Result: Good. Very fast grower and matured quickly. Sown on dry land and despite dry weathers produced 10 to 1.

Somerset East.

Mr. C. C. Brown.—Destroyed by grubs and locusts.

Barkly West.

Mr. G. H. Collen.—Sown February, 1907. Attacked by locusts when very young. Not suitable, seed too small.

Stellenbosch.

Mr. U. Alderman.—Sown November, 1907. Result: Fair. On account of dry weather was obliged to cut for green fodder. Judging by growth it should be very suitable for the district.

Port Beaufort.

Mr. W. W. Painter.—Sown January, 1907. Result: Fair. Attacked by stalk borer. A good mealie to sow about Christmas time on account of its early maturing.

Swellendam.

Mr. N. J. Steyn.—Sown December, 1906. Result: Good. Slow grower but the best of all varieties tried. Hardy and likely to stand drought. Recommend sowing in October.

Middelburg.

Mr. C. von Bratt. Grew too slowly owing to drought, finally killed by frost.

Humansdorp.

Mr. F. W. Damant.—Sown September. Destroyed by grubs.

Griqualand East.

Mr. J. M. Dorning.—Sown September. Destroyed by grubs.

Mr. C. H. Bradley.—Sown 16th November. Result: Good. Sown in drills on dry black alluvial soil they came on well producing 60 to 1. Some cobs measure 18 inches in length. Very suitable for these parts

Hanover.

Mr. H. B. W. Lindsay.—Sown November. Result: Indifferent. Sown on irrigable land it did well until water gave out when it died off.

Paarl.

Mr. L. M. Stella.—Sown November. Result: Good. Sown in drills on sandy soil and manured with Government guano it produced from 50 to 1. Consider it a good crop.

Mr. J. A. Perold.—Sown October. Result: Good. Profitable for table and fodder purposes, it being a quick maturer. Sown in drills on dry land. Weather dry during growth.

Mr. P. C. Beyers.—Sown September. Result: Poor. Drilled and irrigated on black loam it does not appear suitable to district.

Mr. A. G. Le Roux.—Sown November, 1907. Result: Good. Very suitable mealie for district.

Knysna.

Mr. John Read.—Destroyed by stalk borer when in cob.

Tembuland.

Mr. J. L. Dewett.—Failed to germinate through drought.

Mr. J. H. Brink.—Sown December, 1908. Result: Indifferent. Sown broadcast on black ground it yielded poorly. "Do not consider it suitable for us."

Samples sent to Stutterheim, Worcester, Mossel Bay and Bedford were destroyed by grub or killed by drought.

HICKORY KING MEALIE.

This is no new mealie to the country but is well known and has given satisfaction. It is a slow maturing mealie and is better suited to the coast belt where the seasons are long and there is less likelihood of it being destroyed by frost. Thirteen reports have been received to date, of which 7 are in its favour, two are bad and four failures due to drought and grubs.

Komgha.

Mr. T. A. Newey.—Sown November. Result: Good. Yielded 50 to 1. Very suited to district. Sown in drills on light red sandy soil.

Tulbagh.

Mr. E. J. M. Schrenk.—Sown October. Failed through drought

Ceres.

Mr. G. Louw.—Sown October. Result: Good. Yield 106 from 1. Irrigated and drilled thinly on black vleis soil. Very suited to district and can recommend it.

Mafeking.

Mr. E. J. Powell.—Sown November. Seed failed to germinate through drought.

Griqualand East.

Mr. E. S. Thompson.—Sown October. Result: Good. Suited to district. Sown on dry ground it gave a yield of 20 to 1.

Albany.

Mr. H. Norden.—Sown October.—Result: Good. Badly affected by drought. Think it the best of mealies judging by the few cobs obtained.

Mr. P. J. Norden.—Sown September. Destroyed by cutworms.

Mr. L. B. Webber.—Sown September. Destroyed by drought and cutworms.

Riversdale.

Mr. H. P. Grace.—Sown November. Result: Good. Yielded 114 to 1. Sown in drills and irrigated on old vleis land. Very suitable for these parts. Does not stand drought so well as some of the yellow varieties.

Van Rhynsdorp.

Mr. P. A. van Zyl.—Sown October to January. Result: Bad. Grew well under irrigation but yielded a miserable crop. Not suited.

Caledon.

Mr. W. H. Klijn, Junr.—No date given. Result: Bad. Sown on rich soil in drills and irrigated it only produced a few cobs. Not worth sowing.

Vryburg.

Mr. G. D. Smith.—Sown 25th November. Result: Good. Broadcast on sandy loam it produced 60 to 1, maturing in six months. Consider it a very suitable crop if properly cared for.

King William's Town.

Mr. Geo. Kilfoil.—Sown September. Result: Good. Produced 40 to 1 when drilled on rich soil. It was attacked by "stalk borer." Splendid for district.

BRAZILIAN FLOUR CORN.

This is a variety of the "Brood" or Maizena mealie. It has given satisfaction wherever grown, producing large yields. Every report so far received has been in its favour, and it seems to be a variety to be recommended for further trial. Fifteen reports are to hand to date, and are as follows:—

Komgha.

Mr. T. A. Newey.—Sown November. Result: Good. Yielded about 45 to 1. It is a vigorous grower and bears good, well-filled cobs. Grain is rather light.

Vryburg.

Mr. W. H. Edmunds.—Sown January. Result: Good. Yielded 134 lbs. from $\frac{1}{2}$ lb. Matured in 4 months. Drilled 3 feet apart in vleiground. Is a strong grower and good drought resister.

Mafeking.

Mr. E. Kinsley.—Sown October. Result: Good. Was sown on light sandy dry land. Is a strong grower and good bearer.

Mr. C. le Roux.—Sown November. Result: Good. Broadcast thinly on well manured sandy soil and irrigated. It gave an enormous yield, 400 to 1, and is a good paying crop.

Mr. E. J. Powell.—Sown October. Result: Good. Yielded 45 to 1. Drilled on heavily manured sandy loam. Is a good cropper. Should be sown earlier, as it was slightly nipped by frost.

Clanwilliam.

Mr. W. W. Smuts.—Sown October. Result: Fair. Drilled thinly and occasionally irrigated it gave 12 to 1. Water scarce. Unable to say if suited.

Graaff-Reinet.

Mr. T. W. Bellingham.—Sown October. Result: Fair. Mealies grew well and to all appearances would have given a good crop, but it was nipped by frost and partly destroyed by cattle.

Griqualand East.

Mr. E. S. Thompson.—Sown October. Result: Good. Sown broadcast on dry land, the seed came up badly, but the yield from the few was good. Good mealie for district.

Bathurst.

Mr. L. Nel.—Sown November. Result: Good. The drought played havoc with the crop, notwithstanding which it yielded 67 to 2. Good for district.

Albert.

Mr. A. J. Coetzee.—Sown December. Result: Good. Attained a height of 8 feet when it was caught by frost. Should be sown about October. Strong growing variety.

Colesberg.

Mr. P. C. Venter.—Sown December. Result: Good. Drilled and irrigated it yielded 200 to 1. Very good for the district.

Mr. C. R. Venter.—Sown December. Result: Good. Yielded 175 to 1. Drilled and irrigated. Makes a very good mealie meal bread.

Mr. A. P. Venter.—Sown December. Result: Good. This variety is very useful. It makes good white flour. It was partly destroyed by locusts, but yielded 100 to 1. Can recommend it.

King William's Town.

Mr. Geo. Kilfoil.—Sown September. Result: Good. Drilled thinly on rich soil it answered well, producing 80 to 1. Harvested in April. Consider it very suitable, and recommend it to be sown on a large scale.

Riversdale.

Mr. H. P. Grace.—Sown November. Result: Good. Produced 98 to 2 when sown broadcast on irrigated heavy clay soil. Harvested May 18th. Good for district, but Hickory King much superior.

WATERLOO EXTRA EARLY.

This is a yellow dent variety somewhat resembling the "Pride of the North." Only a few reports are as yet to hand, so it is impossible to form an opinion as to how it suits the country. Of the seven reports to hand, three are favourable, three negative, and one bad.

Stellenbosch.

Messrs Louw Bros.—Sown September. Result: Bad. Did not do very well. Cobs were not well filled.

Paarl.

Mr. P. J. Hugo.—Sown November. Result: Good. Sown in drills on sandy loam, and irrigated it came on very well in three months.

Mr. A. G. le Roux.—Sown November. Result: Good. Harvested February. Well suited to district.

Tulbagh.

Mr. N. P. Rooke.—No date given. Result: Good. Consider this a good, early, quick-maturing mealie. Will do well where irrigation is possible. Is excellent for table use.

Jansenville.

Mr. C. G. Lee.—Sown October. Destroyed by mealie grub.

Griqualand East.

Mr. B. J. Pienaar.—Destroyed by cutworms.

Bathurst.

Mr. J. Arnold.—No date. Failed to germinate due to drought.

MAIZE: POPCORN.

This species of maize is largely used in America. Its great value lies in its properties of popping, which is a complete eversion or turning inside out of the kernel, due to the expansion of moisture when heat is applied. Otherwise it is used as a poultry mealie. Ten reports have been received to date, four of a good nature, five bad and one negative due to locusts. Altogether it is not considered suitable owing to its properties not being fully understood.

PEARL POPCORN.

Herbert.

Mr. A. C. Martin.—Sown 23rd October, 1906. Result: Good. "The crop grew well enough, but I do not think it would be of any value. The corn 'popped' nicely when held over hot coals." Attacked by birds and locusts during ripening. Reaped early March. Yield 23 to 1.

Barkly West.

Mr. G. H. Collen.—Sown February, 1907. Result: Bad. Attacked by locusts when small. Unsuitable. Seed too small.

Ceres.

Mr. R. G. Louw.—Sown October. Result: Good. Grew very well, but did not bear owing to continued drought. Suited to district. Drilled on dry land.

Stellenbosch.

Mr. J. E. de Villiers.—Sown November. Result: Poor. Drilled on black loam, irrigated and manured, it gave a very poor return. Do not consider it suitable

Albert.

Mr. W. N. Coetzee.—Sown January. Result: Good. Sown in drills on sandy soil it grew well and ripened by 10th May. Consider it very suitable for district.

WHITE RICE POPCORN.

Griqualand East.

Dr. G. R. Watson.—Sown 19th December, 1906. Result: Bad. Sown broadcast thickly on unirrigated land. Weather extremely wet. Small fly troubled crop. Sample imperfect. Kernels absent or withered, only a few green.

Knysna.

Mr. R. Cowley.—Sown 16th October, 1906. Result: Bad. Planted on irrigated land. Reaped beginning of March. Yield very small. Destroyed by grubs. Unsuitable to district.

AMERICAN POPCORN.

East London.

Mr. Jas. Estment.—Sown December 14th, 1907. Result: Bad. Never matured. Will not pay, grain too small.

Stellenbosch.

Messrs. Louw Bros.—Sown September, 1908. Result: Good. Sown on sandy loam in drills and irrigated, it produced nice little heads, some stalks yielding five cobs. Very suitable to district.

MAIZE: SWEET FODDER CORN.

This species of maize is largely used for table purposes owing to the sweetness of the grain. In America this variety is canned and becomes an article of trade as such. It requires a warm situation and a fair amount of moisture to bring it to maturity quickly. Seventeen reports have been received to date, of which 8 are good, 5 bad or indifferent and four negative due to accidents or drought.

Stellenbosch.

Mr. A. C. Buller.—Sown December, 1906. Result: Indifferent. Seed arrived too late to allow cobs to mature properly. It is a dwarf growing mealie.

Queenstown.

Mr. W. J. Marshall.—Sown December, 1908. Result: Bad. Half of the seed never germinated, and it seems quite unsuitable to district. Only grew 18" high.

Vryburg.

Mr. H. Schindehutte.—Sown 24th December, 1906. Result: Good. Sown thinly in drills and irrigated. Crop partly destroyed by locusts. Very suitable to district.

Mr. G. D. Smith.—Sown November, 1908. Result: Good. Broadcast on dry sandy loam it did well. Produced 65 lbs to 2. Harvested middle of May. Excellent for table purposes. Grew 4' 6" to 5 feet, bearing cobs low down.

Knysna.

Mr. R. Cowley.—Sown October, 1906. Result: Bad. Sown broadcast on irrigated land. Reaped beginning of March. No yield. Destroyed by grubs. May do better if sown at a different time.

Mr. H. Hunter.—Sown July, 1907. Result: Good. Sown in sandy soil it did well. Consider it suitable and that it will pay.

Graaff-Reinet.

Mr. E. Thornton.—Sown January, 1906. Destroyed by locusts.

Mr. F. M. Bellingham.—Sown October. Result: Indifferent. It is too slow growing. It produced cobs but was destroyed by frost.

Victoria West.

Mr. J. J. de Clerk.—Sown December. Result: Good. Ten pounds sown, 120 lbs. yield. Suitable and will pay. Should be planted end of October or beginning of November. An excellent fodder and very nice for table use.

Victoria East.

Miss E. Stewart.—Sown December, 1907. Result: Good. Sown on black ground and irrigated it did well and should do well in district.

Mr. A. Mildenhall.—Sown September, 1908. Result: Failure. Germinated badly. Those that came through failed on account of drought.

Peddie.

Mr. L. K. Currin.—Sown September, 1908. Result: Indifferent. Three parts destroyed by mealie grub; seemed more susceptible to it than other varieties. Yielded 5 to 1. Broadcast on dry land.

Paarl.

Mr. O. Monnig.—Sown September, 1907. Result: Fair. Sown on sandy loam. Not considered suitable as the West is too dry in summer. Yield 40 from 2 lbs. sown.

Cape.

Mr. H. C. Starke.—Sown September, 1907. Result: Good. Sown in drills on lightly manured dry sandy loam. It is a stooling variety and is not so suitable as some of the other varieties.

Mafeking.

Mr. W. Haybittle.—Sown November. Destroyed by stock.

Van Rhynsdorp.

Mr. D. E. van Zyl.—Sown November. Result: Good. A very good mealie for these parts, yielding 102 from 1. Was drilled thinly on loam and irrigated.

Port Elizabeth.

Mr. J. A. Gordon.—No date given. Owing to dry weather no crop was reaped.

SUMMARY.

It will be seen by this report that Leaming Improved, Pedricks Perfected Golden Beauty, Brazilian Flour Corn and Thoroughbred White Flint, also known as Manifold, have given the best result. P. P. Golden Beauty and Manifold are now becoming universal favourites, especially the latter.

ANIMAL DISEASES—CONTAGIOUS AND INFECTIOUS.

Summary of Outbreaks of Contagious and Infectious Animal Diseases Scheduled under Act No. 27 of 1893.

Still under Quarantine on 28th February, 1910.

DISTRICT.	Anthrax.	Epizootic Lymphangitis.	Glanders.	Lung-sickness.	Redwater.	Scabies (Equines.)	Sponsiëkte.	Totals.
Albert	...	...	1	...	...	...	...	1
Alexandria... ..	3	...	...	...	...	...	...	3
Barkly West	4	...	...	...	...	...	...	4
Calvinia	...	...	1	...	...	...	...	1
East London	3	...	...	...	...	...	4	14
Fort Beaufort	...	...	...	...	...	...	1	1
Herschel	...	...	...	...	...	...	1	1
Hope Town	...	...	...	1	...	...	...	1
Humansdorp	...	2	...	...	...	3	...	5
King William's Town	2	...	...	6	...	...	2	10
Komgha	1	...	...	8	...	...	1	10
Kuruman	1	...	...	...	...	...	...	1
Mafeking	...	...	...	...	...	...	1	1
Stockenstrom	...	...	...	...	1	...	...	1
Uitenhage	...	1	...	...	...	...	...	1
<i>Tembuland.</i>								
Umtata	...	...	...	5	...	...	...	5
Engcobo	...	...	...	22	...	...	...	22
Xalanga	1	...	...	...	...	...	...	1
St. Mark's	...	...	...	3	2	...	1	6
Mqanduli	...	...	...	4	...	...	3	7
Elliotdale	...	...	...	4	...	...	...	4
<i>Transkei.</i>								
Butterworth	...	...	...	2	...	...	...	2
Kentani	...	...	...	1	...	...	7	8
Nqamakwe	2	...	...	8	2	2	4	18
Tsomo	...	...	...	4	2	...	...	6
Idutywa	...	...	...	10	...	...	...	10
Willowvale	...	...	...	9	...	...	20	29
Port St. John's	...	...	1	1	...	...	...	2
<i>Pondoland.</i>								
Libode	...	...	...	3	...	...	1	4
Nggeleni	...	...	...	5	...	...	1	6
Lusikisiki	...	...	...	4	...	...	...	4
Flagstaff	...	...	...	3	...	...	...	3
Tabankulu	...	...	...	4	...	...	...	4
<i>East Griqualand.</i>								
Mount Ayliff	...	...	...	1	...	...	1	2
Umzimkulu	1	...	...	...	...	...	8	9
Qumbu	...	...	...	2	...	...	...	2
Tsolo	...	...	...	8	...	...	...	8
Mount Frere	...	...	...	1	...	...	...	1
Mount Fletcher	...	...	...	...	...	...	1	1
Totals	18	3	3	126	7	5	57	219

J. D. BORTHWICK, Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 4th April, 1910.

THE DANISH SYSTEM OF CATTLE BREEDING.

By PETER AUG. MORKEBERG, Live Stock Commissioner to the Danish Government.

Denmark is mainly an agricultural country, and the population has for centuries been chiefly occupied in agriculture. During the first three-quarters of the last century the growing and export of corn formed the chief source of income for the country, and at that time cattle played an inferior part. About the year 1850 dairy-farming began to come into prominence, at first on the large estates, of which there are not very many, and afterwards on some of the smaller holdings of a hundred acres and less, where the owners moved with the times. Two-thirds of the Danish soil is owned by peasant proprietors of holdings of an average size of 90 acres, but in the beginning dairy-farming did not pay as well on these small holdings as on the large estates, because butter produced in small quantities did not fetch as good a price.

Introduction of Co-operation in Dairying.—It was not till the middle of the eighties that dairy-farming became a general practice. At that time the centrifugal cream separator was introduced, and co-operation was applied to dairying. Co-operative dairies were built one after another throughout the country with amazing rapidity, and in consequence milk had the same value, whether from a single cow or from a herd consisting of a couple of hundred cows. All Danish farmers thus became interested in procuring the most productive cattle and in tending and feeding them well, so as to produce large quantities of milk at the lowest cost. From that time dairy-farming has been the chief source of income in Denmark, and the work of improving the quality of the cattle so as to obtain the greatest return has been carried on with great energy.

Breeds of Cattle.—Originally there were two distinct breeds of cattle in Denmark, the Black and White Jutland and the Red or Red-and-White Island breed. Both were milking breeds, but small, and not well developed. In the first half of the nineteenth century many attempts were made to improve the national breeds by crossing with various foreign breeds, but experience showed that better results were obtained from the native breeds if only these were well cared for.

From the year 1870 the two national breeds have been kept pure. They are the *Jutland Dairy Cattle*, which are chiefly found in Jutland, and the *Red Danish Dairy Cattle* found on the islands. There are, besides, a few other breeds, but they are at present of little importance. The work of improving the breeding of dairy cattle has been simplified by the fact that attention could be centred on these two breeds, each confined to its own district.

Cattle Shows.—The first step taken to improve the cattle was the introduction of cattle shows. These shows were organised by the Agricultural Associations, while the State gave a small grant towards the prizes. At first all breeds and crosses competed together, and the judges simply picked out the individuals that appeared to be the most typical

milkers. Later on the different breeds were kept separate, and prizes were awarded for animals possessing the typical characteristics of the breed.

English example showed that individual breeders could exercise the greatest influence on the general development of the breed by supplying superior breeding animals to other herds. This led to a change in the management of the shows, and prizes were awarded not for single cows, but for collections of cows bred by the exhibitor, the idea being to point out to intending buyers of cattle the herds from which they should buy. This change took place about 1870, and the showing of collections of cows continues to the present day.

When, in the eighties, interest in the improvement of cattle-breeding became more general, the State gave further assistance, and caused special shows for bulls over three years old to be held. The object of these shows was to encourage farmers to keep their good bulls for a longer time. The effect has been striking; while in 1887 only 371 bulls were presented at these shows, there were in 1908 more than 1,200. At some local shows as many as 250 old bulls are shown every year.

Methods of Judging Cattle.—At these shows a new principle was introduced, viz., the judging of the bulls through their offspring. Prizes are not awarded for bulls five years old or older unless their offspring, which must be judged before the show, has been found satisfactory. The quality of the offspring is undoubtedly the best proof of the breeding value of a bull, and although the judging of the offspring takes a long time, it is a most useful institution, and a special feature of the Danish shows.

At these shows the judges do not restrict themselves to a consideration of the points of the exhibited animal, but also take into account in the case of bulls the pedigree, and information as to the milk production of the dam, grand dam, etc., and in the case of cows the milk production, both as regards quantity and quality.

Breeding Centres.—Another means of developing cattle-breeding has been the systematic selection of the best herds, which receive an official designation as "Breeding Centres." Experience has shown that certain herds have had a very great influence by supplying good breeding animals to other herds. It is, therefore, a matter of great importance to find such prominent herds and to encourage their formation, in order that good breeding animals may be distributed from them. It has been one of the special aims of the cattle shows to draw attention to such herds, but at the shows only a few animals from a herd are shown, and these not average specimens but the best individuals. It is also impossible at a show thoroughly to study the descent and the breeding quality of the animals, while their milk production cannot be properly estimated with due regard to the feeding, the way of keeping and of milking, time of calving, and other conditions affecting the production. For these reasons the judging at the shows has its distinct limitations, and a new feature, viz., competitions between the best herds in the country, has been introduced.

These competitions are carried on during two whole years; a Committee of Judges visit each of the competing herds five or six times on the farms, and are assisted by young men who, on every twentieth day during the two years, visit each of the competing herds, weigh the milk of each individual cow, test the percentage of fat, weigh the fodder given to each cow, and draw up the family herd-book, etc. After the two years' testing the Committee of Judges are in possession of reliable information about the different competing herds, and a reliable award can be given. Those herds for which prizes have been awarded after such competitions are then termed "Breeding Centres."

A detailed report on the competing herds is published, so that each farmer can form his own opinion of the herds. The family herd-book drawn up for each herd is left with the owner. In this herd-book the whole herd is arranged according to maternal descent, and for each animal information is given as to the sire and dam, description, production, and prizes. This information forms a reliable and easily accessible guide to intending buyers, who can soon ascertain whether a certain animal belongs to a family of fixed type or whether it is an isolated star.

These competitions between entire herds, resulting in the selection of breeding centres, began in the year 1884, but it was not until 1894, when the Gerber transportable apparatus for estimating the percentage of fat in milk was introduced, that the competitions took the complete form here described. In 1897, the importance of these competitions was so generally acknowledged that the State gave a yearly grant of £4,000 sterling for four years to assist them. To the best breeding centres as much as £150 could be awarded annually for each of the four years. This encouragement from the State had a great effect: many more herds were entered for the competitions, and the attention of the whole farming community was awakened to the importance of securing good bulls, with the result that there was an increased demand for good breeding animals at enhanced prices. This grant from the State has since been discontinued, and the State now pays only for the administration of the competitions. But the competitions are continued, and preserve their popularity, while their good influence is unabated.

These two-yearly competitions between whole herds, as well as the family herd-books drawn up in connection with them, are special Danish features.

Family herd-books have been drawn up for many other herds than those which have been selected as "Breeding Centres," and they form a valuable help in the management of the herd. Altogether, six hundred family herd-books are in existence. There are, of course, also the official herd-books for both breeds of Danish dairy cattle.

I have hitherto dealt with the systematic endeavours to encourage the breeders, and to find the best breeding centres and the animals within these which are considered most valuable for improving the breed. The chief aim has been to encourage economical dairy-farming; it is not only the points of a pure typical breed and a harmoniously developed milking strain which have been aimed at, but a large yield of milk and a high content of fat have also been duly considered. Definite information as to the yield of the cows and the yield of the dam of the bulls is demanded, and this information enters directly into the judging of the animals. For our ultimate goal is a breed of cattle not only fine in form and typical as milkers, but also and chiefly a breed giving a good money return.

I shall now deal with the efforts which have been made to let cattle-breeding in general benefit from the result of the work of prominent breeders, and thereby improve the position of dairy-farming throughout the country. Two features must be mentioned: the Associations of Cattle Breeders, or Cattle-Breeders' Societies, and the Control Unions or Cowtesting Associations.

Associations of Cattle Breeders.—Before the year 1870 little attention was given to the bull; the nearest bull or the cheapest bull was considered the best. The bull was generally used from one or two years old and then killed, so that before the influence of the individual bull could be traced in the offspring the bull had disappeared.

With the improved conditions in the seventies this was gradually altered, but it was not till the eighties, when the co-operative dairies caused greater attention to be given to the feeding and the production

of the herds, that the influence of the sire as equal to that of the dam was generally acknowledged. The idea was then introduced for several farmers in a district to buy and to use in common a good bull, and to keep this so long as it gave satisfaction.

This was the beginning of the so-called Associations of Cattle Breeders, which arranged that only the best cows should be served by the bull, and these cows should be selected by the Committee. The Committee should, furthermore, inspect the various herds belonging to members of the Association, and should ascertain the state of health of the animals. The offspring of the selected cows by the bull of an Association should be presented at the local show. The members of the Association were also required to keep accounts of the feeding and production of the individual selected cows.

The first of these Associations was formed in 1883. During the next year it found only a few imitators, but when the State, in 1887, offered these Associations a yearly grant, the development became a rapid one.

There are now 1,300 Associations of Cattle Breeders with 1,500 bulls, and for each bull the State gives a yearly grant of £8 on condition that the bull has taken a prize, that it is examined by a veterinary surgeon twice every year, that the best cows of the members are selected by the Committee to be served by the bull, and that the Committee at least once a year inspect all the herds in the Association as to their health.

The effect of these Associations on the development of cattle-breeding has been very striking. In the first place, 1,500 really good bulls are now in constant use throughout the country. The result of the work of the prominent breeders is thereby turned to advantage, while the increased demand for good breeding animals, resulting in better prices, in its turn encourages the effort to form new breeding centres.

The prices which these Associations pay for young bulls vary a good deal, but average about £40. Some of the leading Associations have paid as much as £170 for the best bulls. Generally about 80 cows are served by one bull, and the annual subscription of members average about 3s. 6d. per selected cow, but is more in the Associations with more expensive bulls. The members' subscription is kept down not only by the grant of £8 from the State, but also by the money prizes awarded for the bulls at the shows.

Milk-Control Associations.—The Associations of Cattle Breeders carried out their programme satisfactorily, except so far as keeping accounts of the feeding and production of the individual cows. When in the beginning of the nineties their account-keeping was increased by a demand for information as to the percentage of fat in the milk, it was found quite impossible for individual members to do this work, although it was generally admitted to be very important. It was particularly necessary to have the richness of the milk tested, as no outward sign gives any indication of this point.

This led to the formation of the Control Unions, the first of which was formed in 1895. The object of these Unions is to strike a balance-sheet for each individual cow, for guidance in feeding, for weeding-out cows that do not pay, and for help in selecting those cows from which to breed. The object is attained by the farmers within a limited district jointly appointing a young man as "Control Assistant," who once every fourteen or twenty days visits each member, measures the quantity of one day's milk yielded by each of his cows, estimates the percentage of fat by means of the Gerber apparatus, and weights the food given daily to each cow and keeps account of all this. He has, further, to keep a list showing

when the cows were served, when they have calved, the sex of the calves, and what has become of them. All this is for the purpose of drawing up a family herd-book at each farm.

These Control Unions have found great favour with Danish farmers. There are at present 49 Unions, comprising 10,925 farmers with, together, 187,345 cows, or more than 17 per cent. of the total number of cows in the kingdom. The work of the Unions is carried on by more than 500 assistants; the State gives its support by grants up to £14 per Union, but not more than a total of £6,670 in any one year. The subscription of the members is one to two shillings per cow per annum.

These Unions are undoubtedly very useful. It is only through the work of these Unions that it is possible to obtain the information about the yield of the individual animals by which the animals are judged at the shows and competitions. The selection of cows within the Associations of Cattle Breeders is also carried out on the basis of the data obtained from the Control Union.

Result of the Work.—If I am asked what has been the result of all these features of the work of improving the breeds of dairy cattle, I shall not be able to give a satisfactory answer. I might say that the yield of Danish cows averaged in 1864 about 80 lbs. of butter; in 1887 116 lbs. of butter; and in 1908 220 lbs. of butter.

I might mention that the export of home-produced butter from Denmark during the years 1865—1874 was about 130,000 cwt., while in 1905 it was 1,590,000 cwt., in 1907 1,710,000 cwt., in 1908 1,778,000 cwt.

I might further mention that while the average yield of Danish cows is about 220 lbs. of butter, the average of the 40,000 cows in the Control Unions in Funen was about 285 lbs., and that the average yield of the best herds is more than 330 lbs. of butter per cow.

But these figures do not give a true representation of the result of the improvement in the quality of the herds, which is due to the better selection of breeding animals, because concurrently with this improvement there have been other improvements, notable in the better feeding of the cows and the better rearing of the young stock. To feed our cattle, we now have to import large quantities of corn and other feeding stuffs, while the production of roots has been enormously increased. The number of cows has also been increased considerably.

How much of the improvement is due to the better quality of the herds, and how much to the better feeding, it is impossible to say. But it is certain that there has been an improvement, and a very considerably one, and I feel convinced that our endeavours have tended to improve the breeds of dairy cattle in Denmark.—*Journal of the British Board of Agriculture.*

ARTESIAN WELL BORING MACHINERY.

By C. A. SCANLEN, late of the Waterboring Branch, P.W.D.

This article will, it is hoped, be found useful to beginners, as well as those who have had some experience in the art of drilling.

The machinery of the drilling plant may, roughly speaking, be divided into three sections, namely: (1) engine and boiler; (2) drill body, and (3) force pump. The engine and boiler are, of course, the principal parts of the drill, seeing that they are to be depended upon for their motive power. It is essential that all engines be kept scrupulously clean, since the dirt and grit which accumulates so quickly is apt to wear away the crank shaft bearings and spindle, as well as other various adjustments if not immediately removed. This is specially the case with steam engines. The latter are found to be most suitable for the field. Oil and suction gas engines must be housed, whereas with the steam engine this is not the case. A canvas covering is quite sufficient as it is not affected so much by the inclemency of the weather as other engines are.

To ensure safety, and inconvenience through accidents, to foremen who are stationed at a distance from any railway station, all boilers and boiler tubes are thoroughly examined and tested up to a certain pressure before being sent out for field work.

Care must be taken not to steam the boiler too quickly, as the overheating of the cold metal too suddenly is apt to injure the boiler tubes and boiler casing. This sudden overheating invariably causes the steam to escape, and boiler to leak.

Clean water must be used, when obtainable, for if impure or very brack water is used it is apt to corrode the inside casing, which often leads to explosions and perhaps great loss through delay in obtaining a new boiler. A caking of calcareous matter is left on the tubes from the same cause, which often becomes so thick as to make it very difficult to get up steam, because the heat takes some time to penetrate the coating thus formed. This is also a cause of interference with the injectors and check valves. In order to remove this matter from the boiler tubes, caustic soda is used. This is mixed thus: Half a paraffine tin of water, with half a lb. of caustic soda. Then injected, while working drill. After working hours the manhole door and mud plugs are opened. Of course this must be done when the water and boiler have cooled down, or otherwise there will be a catastrophe. The remainder is scaled, and the boiler washed out with clean water, often using the forcepump to wash out small bits of scale that one is unable to remove otherwise.

Under no circumstances whatever should an engine be left to the tender mercies of a native attendant. Very often this individual has not the knowledge of manipulating the injectors, which negligence causes injury to the crown head plate of the firebox, since the water is allowed to run low in the boiler, and thus causing the crownhead plate to get burnt. In order to prevent this plate getting burnt or causing a serious

accident, a fusible plug, which is filled with lead is used. As soon as the water in the boiler gets too low and the crown headplate becomes heated, the lead melts out, thus allowing a free passage of water from the boiler, which immediately extinguishes the fire, and so saving the situation. Flushing of boiler should be done as regularly as clockwork, and as often as possible, because by doing so this ensures the safe working of all the injectors, valves, etc., and that they are free of foul matter. The time that it should take to steam a boiler is from $1\frac{1}{2}$ to 6 hours, according to the dimension and capacity of a boiler. An attendant can steam a boiler very easily by banking his fire, by using a large quantity of dry ash, which he only needs to remove in the morning with the slicer. All he has to do then is to light a fire from the embers, and as the boiler is still quite warm, owing to this fact, he has no trouble to get up steam, and there is no fear of injury to tubes or crown head plate.

The piston rod gland and packing should be well greased and screwed up, so as to prevent any escape of steam. Always see that your engine cylinder is well oiled as well as the machinery before commencing work in the morning. The piston rod gland and packing must be well taken care of, and replaced whenever it requires renewing. Care must be taken of the cross head slide bar, and fill it with white metal before the slide is worn too far. The cylinder should receive periodical examinations, in order to ascertain the conditions of the piston rings and rod gland packing. The frequency of this must be determined according to the speed the engine is run at. The speed is determined according to the weight that is used. For instance, should less weight be used on the drill body paddles, it is necessary to increase speed, and in the case of more weight, reduce speed. This entirely depends upon the nature of the strata that the boring is being done in. The first lesson an apprentice is taught on entering the service is, "not to use a hammer as a spanner, and a spanner as a hammer."

A belt not properly attended to, becomes brittle and breaks in use causing considerable trouble and may be great delay. To keep this belt in order it is necessary to keep it well wiped with an oily rag or waste, and put away in a dustproof and dry place, which ensures long life to it.

When erecting the drill body, great care must be taken to have the foundation of the slides perfectly level. Otherwise the least cant of the machine head out of the perpendicular will cause great trouble, when the drilling has been proceeded with to a considerable depth; for the bore-hole must be absolutely perpendicular. When the drilling is in full swing the working of the engine is apt to jerk the drill body out of its place, thus injuring the diamonds. As a preventive of this, weights, such as sandbags are put on each side of the machine to keep it perfectly rigid.

The speed at which the drill machine is driven must be uniform, for if not, the irregular speed at which it is going and the broken formations of strata, are apt to injure the crown as well as the diamonds, thus causing perhaps the loss of both.

When boring through solid strata, less weight should be used, thus allowing a higher speed, such as about 70 to 80 revolutions per minute. But through soft formations and fragmentary strata heavier weights should be used with a lower speed, say, that of about 65 revolutions per minute or even less.

Should a crown by misfortune become stuck, gentle usage is advised. Rough usage more often than not results in the loss of the crown, when trying to extract it.

The forcepump is principally used in diamond drilling, to clear away the dirt and sediment from the crown and diamonds while in operation.

The drilling material of the Jumper drill are weighty and unwieldy, but the machinery is more simplified by having the engine, boiler, and jumping gear all on one body or frame. This makes it easier for transporting, for with the diamond drills two ox-wagons are required to transport it, whereas with the jumper only one conveyance is necessary to carry the tools and other material used on them.

IRRIGATION FROM ARTESIAN WELL SUPPLIES.

Owing to the rarity of rainfall in many parts of this country, the problem has arisen among the farmers, as to the most efficient means of obtaining supplies for irrigation of fertile land. This has proved a question of vital importance to the whole of the stock breeding and agricultural community of South Africa.

As the years go by, the necessity of irrigation schemes, has forced itself strongly upon the minds and attention of our politicians, as well as the farmers in this country. This subject can be coped with, only by means of large sums being advanced by the several Governments of the country, skilfully employed and properly directed.

This is the only way that South Africa can ever hope to become a prosperous stock bearing and agricultural country, and be able to compete with other countries in the way of exportation of her produce. Whereas now all the grain, etc., that this country is capable of yielding has to be imported from foreign countries.

The problem which presents unlimited difficulty to the farmers in this country, is that the rainfall is limited to certain belts and periods of the year. This is prevalent in most of the Karroo districts and Hinterland, including pastoral areas of Namaqualand and Bechuanaland. On the coastal regions, where the rainfall is more abundant, the surplus supply cannot be brought into immediate use; owing to the prohibitive height of the adjoining land, from the river beds, and the strength of weir necessary to be constructed to store water. In addition it is alleged, by various engineers, that there is insufficient catchment area among the surrounding koppies, to enable large reservoirs to be constructed for the storage of water, in times of heavy storms, which are very prevalent here, as contrasted to other countries. Such violent storms, too, invariably carry everything before them like a huge avalanche. The consequence is that this water flows to waste, where it could otherwise have been more beneficially utilized upon the land. The chief methods employed for irrigation, are by borehole, earthen dams, and small weirs, built across rivers, where permissible, and conveyed by means of small furrows to a convenient dam or reservoir.

Artesian well supplies have proved themselves an indispensable adjunct in this country, where they have been sunk.

Before commencing to sink an artesian well, it has been found necessary to remove the soil and boulders, until so called bedrock, or first strata is reached. To prevent the ground from falling back into this dug out shaft, a steel lining tube is inserted, and cemented to the bedrock. When all this has been successfully accomplished the loose earth is thrown back and well stamped down; at the same time keeping the lining tube rigid during operations. This process prevents the escape of water between the bedrock and lining tube, while drilling. Otherwise, the force and weight of water in the borehole and that of the forcepump, used in clearing away sediment from the diamond crown, is liable to wash fine silt into the hole during operations. This substance has a

tendency to settle very rapidly, which will cause the extraction of a diamond crown extremely difficult, should such crown become embedded in it. To avoid this troublesome obstacle, recourse has been had to lifting the rods, etc., a few feet, so as to allow this silt to settle below the crown. Invariably the cause of this silt falling into the hole, is due to carelessness when cementing the lining tube to the bedrock, or by using bad cement. This trouble generally occurs after the commencement of operations.

On no pretence whatever should a drill foreman allow his crown to remain at the bottom of the borehole, either at night or during meal hours in the day time; but lift the rods, etc., five feet or more, with the winchrope, and fix on patent pipe clip as low as possible on top of the lining tube. Then see that the ratchet clip is in position, thus preventing them from falling back, which will cause serious injury to the diamonds.

Should a foreman by accident encounter fragmentary formations, he is compelled to continue boring until solid strata is reached, and then insert an additional length of tubing, to prevent the falling in of the walls of borehole and rubble. Although in many cases the depths of fragmentary sides of the borehole are filled with pure cement instead of tubing. This is allowed to set, and bored out again, leaving a solid film of cement to the walls. This process has rendered excellent service where these igneous formations are liable to cause an obstruction of the above nature.

In many areas it has been found advisable not to bore beyond a certain depth, unless no water supply has been struck, for the reason that at certain depths the strata of shale and sandstone become permeable to water, thus causing the water already struck to disappear into other channels and be unable to recover it, even if boring be continued. In some areas the strata is not of such an intensely cohesive nature, and therefore boring can be continued to an unlimited depth before it is found necessary to abandon a hole.

Applications for drilling by farmers in the last few years have exceeded the figures for those of previous years, which were more than the drills available in the Public Works Department (Water-boring Branch) were able to cope with. In latter years private individuals undertook to do the work by subsidised contracts, but this was also dispensed with in the end.

Drilling plants for boring were sent out under the supervision of a competent foreman to the nearest railway station, free of charge, upon the receipt of the names of the applicants. All the farmer had to do was to convey the drill, which weighed about 5,000 lbs., including engine and boiler, from the station to the site agreed upon, and provide foreman with fuel, labour, and food.

Each applicant was entitled to three holes, not exceeding 400 feet, sunk on each property, unless he was successful in obtaining water in the first and second hole sunk. This was done in order to give each applicant a fair share of having the use of the drill. These drills were guaranteed by Government to bore to a depth of 400 feet, and accomplish the work to satisfaction.

Boring in sandstone and shaley formations, the rate of footage varies from 5 to 20 feet per diem, but in dolerite and quartzites it is considerably less, according to the cohesive nature of such strata.

Should a farmer have been fortunate to obtain a good supply of water by boring, he should have a large reservoir, substantially built, capable of holding a large quantity of water sufficient for household purposes and for the irrigation of several acres of land. This can be built at a comparatively small cost, and be erected on most South African farms, which will prove advantageous to the farmer in the long run.

In order to convey the water from these pumping plants to a reservoir recourse has been had to the installation of piping, with one end connected to the nozzle of the delivery of the pump standard. From thence the installation is continued by connecting the pipes in lengths, which are either left exposed or sunk a few inches in the earth, to protect them from vehicles. Then the delivery end of piping is cemented into the wall of reservoir, protruding a few inches into the interior or reservoir tank. To carry the water from the reservoir to the field boundary an additional installation of piping is required, with a stopcock at the outlet, near the exterior of wall, where the installation is commenced.

The bed of the reservoir should be built at a decline from the inflow to the outflow installations, in order to enable all foul matter to be easily discharged.

It is advisable for a farmer to build several small reservoirs, which are fed by one large reservoir, connected with pipes, having stopcocks at convenient positions. This would ensure him having a constant supply by first filling the small ones, and then refilling the main tank. By this method of storing water a farmer can rely on having a supply on hand, in case of accidents to the pumping plant, and so not be stranded for the want of it. To prevent leakage of pipe joints, recourse has been had to the process known as caulking. If properly executed the joints are rarely known to leak.

At the present time, many farmers still resort to the old methods of running the water, by means of small furrows to a dam, and from there to the land to be irrigated. This can be dispensed with by the installations of piping, and be a great deal more economically employed; for in the old system a large quantity of water is wasted during transmission by soaking into the soil.

Should a good system of irrigation schemes and tenancy of vacant land be introduced, there is little doubt that South Africa could be made one of the most prosperous wool-growing and agricultural countries in the world, and be capable of yielding sufficient grain, etc., for exportation, and for the consumption of its inhabitants as well. This is the only way of combatting this difficulty. It is hoped that in the event of irrigation schemes being more extensively employed, that this subject will be taken up with more energy to encourage farmers in such enterprises as may be deemed beneficial to the country as well as to the farmers.

TICKS AND STOCK DISEASES.

Paper read at the Masouws Kop Farmers' Association (Vryburg District), by Mr. J. Fred Pentz.

For a farmer of my standing, who, I may almost say is still in babyhood as far as the above subject is concerned, to undertake to read a paper on these vast questions, can certainly come under the old saying, "Fools rush in where angels fear to tread." But, gentlemen, ours being an Association in its infancy, criticism is not severe amongst us. We being, as it were, a small happy family, induced me to write this paper. Not to give my opinion and experience but, as it were, to review the opinions and experience of men of science, experience and learning. Amongst them, scientific men of the first grade, men whose ambition it is to be the first to solve those, to us farmers, troublesome questions, men like Dr. Theiler, Mr. Lounsbury, Vet. Surgeon Robertson, and others, have proved what interest they take in scientific research, and I think you will agree with me when I say that the opinions and experience of those men are worth listening to. I do not propose to lay anything new before you to-day. I am fully aware that to at least some of you it will be old news. But knowing that there are others amongst us who do not enjoy the privilege to make themselves acquainted with these matters, I hope you will for their sakes bear with me while reading this paper. That ticks are closely connected with the spreading of certain diseases amongst stock in this and other countries, is an indisputable fact to prove which I need only to refer to your Texas Fever in America; Tick Fever, Redwater, Heartwater and Gallsickness in South Africa.

I fancy I see some of you picking up your ears when I mentioned Gallsickness. Well, we have the testimony of Dr. Theiler and Mr. Lounsbury, that the lastnamed disease is transmitted by at least two kinds of ticks. "Gallsickness" is slowly but surely spreading all over South Africa, and like East Coast or Tick Fever, are the two great troubles facing the cattle-farmers of South Africa. We have the word of Mr. Lounsbury, one of the greatest authorities on ticks, that we have with us ticks quite capable to transmit East Coast fever. How many more of our stock diseases have we to blame the ticks for? Judging from the opinions and experience of men who make a study of it, I fear that we have more tick troubles than we know of to-day. It was only at our last meeting that one of the members reported the loss of calves from a cause new to him, which on examination, he found that the ears of the dead calves, as well as the ears of sick ones, were stopped up with tiny little ticks.

Some people assert that what is called "Hollow eyes" in goats, is caused by this tiny tick getting into the ears of kids and goats.

You are all aware how a few tiny "Tampaans" will completely paralyze poultry.

I will now lay before you a few extracts from the famous article by Dr. Theiler on "Ticks and Diseases," and also extracts from the reports of the evidence given before the Parliamentary Select Committee as late as November last.

ON TRANSMISSION OF DISEASES.

Dr. Theiler says most emphatically that East Coast Fever and Gallsickness, amongst other diseases, *are transmitted by ticks*, and also adds that Lounsbury has proved that the Bontepoot tick transmits Heartwater.

A matter of the greatest importance to us is that Dr. Theiler assures us that with Gallsickness the sick or recovered animal acts as host for the tick. The tick being infected (through the blood it sucks from the sick cattle) with the parasite, in turn carries it back to other cattle.

Dr. Theiler has named the gallsick parasite "*Piroplasma mutans*." He puts the incubation time of the disease at three weeks, and says that ticks increase on a farm as stock multiply. He considers that calves born on South African veld do not suffer from "gallsickness," or not much. (Dr. Robertson maintain that calves "salt" to gallsickness, the same as they "salt" to Redwater when young.)

ON ERADICATION OF TICKS.

Dr. Theiler says:—Grass burning diminishes ticks. The later in the season the veld is burnt, the more ticks will be destroyed. He believes that there is something in the idea that unseasonable veld burning is unhealthy. It is most likely in the fact that too many ticks escape if veld is burned too soon. The ticks found in winter are those left over from the summer, which found no host to gorge themselves on. According to Dr. Theiler's opinion, although dipping will not exterminate all ticks unless one dips every four days, it will, however, eradicate the blue tick, and largely diminish the other sorts.

ON ERADICATION OF DISEASES.

Dr. Theiler says:—Remove the stock to a place free of the disease. Of course, if all *sick, infected or recovered* animals are not left behind, the disease will soon break out again on the clean place. He maintains that we can breed stock free from gallsickness if we first kill all the ticks on the farm we start on, or even with ticks, provided no animals is on the farm which can act as a reservoir of the virus. These, gentlemen, are only a few of the many most useful points contained in Dr. Theiler's article, the whole of which can be read in the July, 1909, number of the *Transvaal Agricultural Journal*. Let us now take a glance into the evidence given before the Parliamentary Select Committee. I extract a few lines from the evidence of Mr. C. P. Lounsbury, Government Entomologist, whose evidence as well as that of Mr. Baines, M.L.C., Natal, is certainly the most interesting.

Mr. Lounsbury says:—By dipping every 14 days the Bont Tick should be eradicated in *a very few years*. Dipping reduces the number of ticks much more than one would theorise from the knowledge of the life cycle of the tick. . . . Systematic dipping will make a vast difference in the number of ticks on a farm. . . . At Cottesbrook farm, where no small stock could be kept and calves suffered from various ills, after a few years he saw 2,000 Angora goats flourishing, and that was solely due to the eradication of ticks by dipping. Through dipping, Heart-water and Redwater have been banished. One point in Mr. Lounsbury's evidence one feels sorry to read and to record, and that is, where he says "We have been accumulating experience in dipping for a number of years, but there has been no one whose special duty it is to keep himself posted with the facts (and this in a country where Government and members of Parliament always and more particularly during election time, shout, "We are, and will be doing all we can to promote agriculture and stock breeding,"). The part in brackets is not in Mr. Lounsbury's evidence.

Mr. Liesenberg, M.L.A., says:—After dipping for some time, cattle will not pick up ticks. He has any amount of proof of that. In his district they lost goats after they started dipping. The goats had lungsickness, and he thinks the dip killed all sick goats, and they are now quite free of that disease.

Mr. Thomas, M.L.A., says:—He had a farm badly infested with ticks. He built a dipping tank a year ago, dipped continuously, and has very few ticks left on his farm to-day.

Mr. Baynes, M.L.C., Natal, being owner of 2,000 head of cattle, had East Coast Fever on his farm, and having eradicated the disease with a loss of eight head of cattle only. I think we can lend an ear to what he had to say. The following are a few extracts from his evidence. Dress the cattle in their ears, under the tail and also the sheath. He even cuts the hair of the brush ("kwas") of the tail to be able to get at the ticks. He has a tank a foot deep through which his cattle walk once a day; and a tick once on his cattle does not get off alive. The dip he recommends is Pitchford's dip, with that one can dip oftener than with "Queensland" Mixture. Before he started dipping, his farm was very badly infested with ticks, but you will have a difficulty to find one there now. All stock on his farm is now doing well. When he started dipping, his cattle were miserable looking things, with staring coats and as thin as possible in condition. Before he dipped he said to himself, "Well, what are you doing. You are importing cattle from Europe, and how are you improving them? Are you successful? You know very well you are not. You are only breeding ticks!" Dipping and fencing were the only things. Cattle got tame through dipping and being handled. He considers the first necessity is to prevent an outbreak of disease, such as East Coast Fever, etc. That can be done by fencing and careful dipping. The border guard he considers of no practical use, for there are innumerable ways of spreading the disease. If he had his way he would not allow any tick-infected cattle to move along any road or by-way. He was quite sure that East Coast Fever was spread by moving cattle. With them in Natal a good dipping tank costs considerably under £100, and the dipping half a penny per head. This is a matter of the greatest importance to us all. Many of us have invested so much in the industry, and we cannot afford "Mr." Bont, Brown, or Red Tick to play ducks and drakes with our £ s. and d., now invested in land and stock. Like true South Africans, we will, of course, not lose heart, but set to and try to do our part to fight the mutual enemy.

Lungsickness, Rinderpest, Redwater, Heartwater, Bluetongue, all very formidable enemies, have been conquered. Let us join hands, and in one way and another wage war against them. May Union bring us less platform but more live sympathy from the new Government, and may it be one who will honestly and truly see that, after all, the farmer is the real backbone of the country. Of course, matters like the eradication of a disease and its causes means much brain, energy, time, and cash. Let us hope that the Treasurer of the Union Government will have funds to spare to devote to scientific research, of which we are so much in need. It seems a pity that the Transvaal Government do not place more of their present surplus revenue aside for scientific research. We have a great enemy in ticks, but that is not all. What about vegetable poisons, which carry off thousands of pounds sterling per year in dead stock throughout South Africa?

It is true the Cape Government is waking up to the necessity of investigating the properties of beneficial and deleterious plants, and has appointed one solitary person to "start" the work. Well may we be asked not to look for results soon. But the late good President Brand said: "Alles zal reg kom."

FRUIT EXPORT.

Return of Fruit Exported from Cape Colony during month of February, 1910.

Port of Shipment.	Destination.	No. of Packages.	Description of Fruit.	Quantities.	Value.
					£ s. d.
Port Elizabeth	England ...	29	Grapes ...	1,240	10 10 0
"	" ...	4	Pears ...	100	2 0 0
"	" ...	5	Plums ...	125	3 2 6
"	" ...	146	Pineapples ...	1,840	18 0 0
Cape Town	Luembe (Congo Free State.)	15	Apples ...	750	1 10 0
"	St. Helena...	4	Pears ...	325	0 16 3
"	" ...	3	Peaches ...	300	0 13 6
"	" ...	4	Plums ...	600	0 17 6
"	" ...	13	Grapes ...	260 lbs.	3 18 0
"	" ...	1	Pineapples ...	100	0 12 0
"	Lobito Bay	51	Plums ...	1,530	5 11 0
"	" ...	116	Pears ...	3,424	18 3 6
"	" ...	18	Grapes ...	350 lbs.	3 10 6
"	" ...	1	Watermelons	24	1 0 0
"	" ...	1	Apples ...	36	0 5 0
"	Loando	20	Plums ...	600	2 0 0
"	" ...	70	Pears ...	1,850	10 10 0
"	" ...	50	Grapes ...	600 lbs.	5 0 0
"	" ...	80	Peaches ...	1,920	8 0 0
"	San Thomé	50	Pears ...	1,500	7 10 0
"	" ...	29	Plums ...	870	2 18 0
"	Lisbon	25	Pears ...	750	3 15 0
"	France	67	Peaches ...	652	3 8 0
"	United States of America.	260	Pears ...	6,500	32 10 0
"	" ...	4	Plums ...	100	0 8 0
"	" ...	20	Peaches ...	500	2 10 0
"	Belgium	39	Plums ...	1,780	3 18 0
"	" ...	20	Grapes ...	240 lbs.	2 0 0
"	" ...	45	Peaches ...	1,080	4 10 0
"	" ...	240	Pears ...	6,000	30 0 0
"	Holland	8	Plums ...	200	0 16 0
"	" ...	560	Pears ...	14,000	70 0 0
"	Germany	15	Nectarines ...	450	2 5 0
"	" ...	145	Peaches ...	4,350	21 15 0
"	" ...	940	Pears ...	26,900	134 10 0
"	" ...	45	Pineapples ...	1,100	4 0 0
"	" ...	48	Plums ...	1,420	4 16 0
"	England	7	Apples ...	180	1 1 0
"	" ...	4,835	Grapes ...	66,553 lbs.	752 8 10
"	" ...	209	Watermelons	1,284	41 13 0
"	" ...	646	Nectarines ...	19,130	98 17 0
"	" ...	5,961	Plums ...	176,894	612 4 9
"	" ...	41,712	Pears ...	1,082,281	5,597 17 10
"	" ...	6,629	Peaches ...	168,077	860 3 0
"	German South West Africa.	127	Apples ...	22,385	53 6 0
"	" ...	31	Bananas ...	23,900	27 0 6
"	" ...	131	Grapes ...	3,738 lbs.	23 15 8
"	" ...	3	Lemons	1,020	3 0 0
"	" ...	17	Oranges	5,070	14 5 6
"	" ...	73	Nectarines ...	2,130	13 12 0
"	" ...	273	Peaches ...	16,185	64 2 6
"	" ...	24	Pineapples ...	1,944	15 5 1
"	" ...	136	Plums ...	21,820	40 13 0
"	" ...	14	Melons	168	4 6 6
"	" ...	689	Pears ...	31,997	137 5 9

INDUSTRIAL ALCOHOL AND FIBRE FROM LEAVES AND STEMS OF PLANTS.

By THOMAS BARRACLOUGH, Compton House, Bournemouth.

During the last fifty years an amazing amount of skill and enterprise has been devoted to the utilisation of what our forefathers called "refuse," or "waste," resulting from mining, industrial, and other processes. They do not seem to have cared much for any results except obtaining or manufacturing the special articles they had in view. The so-called "waste" was considered valueless, and in many cases proved to be a serious nuisance.

Times have changed; the term "waste" as formerly understood is now largely considered to be the offspring of ignorance. Intelligence, technical and commercial, has come to the rescue, and the by-products (formerly called "waste") accruing from an enormous number and variety of mining and manufacturing processes are now made the source of great and ever-increasing profit. In some cases the by-products are of more value than the articles originally produced. In other cases the value of the by-products not only pays the cost of the original process, but leaves considerable profit. In many other cases the knowledge that valuable by-products can be obtained from raw material, not considered worth treating under former conditions, has resulted in the establishment of an immense number of new and profitable undertakings. It would be an easy matter to instance some of the most striking of these cases, but space forbids.

NEW TREATMENT OF LEAVES AND STEMS.

The subject of the present article is to point out that, by means of greatly improved and novel methods of treating the leaves and stems of certain classes of plants, not only can their fibres be extracted, but their juices can be utilised for the production of industrial alcohol. In other words, two valuable articles of commerce can be produced from the same raw materials. I refer to many varieties of the Agave (aloe) family, and also of the closely allied families of Fourcroya and Maguey, likewise of the Sansevieria family. There are other plants the leaves and stems of which contain equally valuable fibres and juices. Our knowledge of them is daily increasing.

Many of the above plants are at present utilised solely for the production of their fibre. Some of them are utilised on a very large scale in Mexico mainly for the production of a kind of beer, called Pulque; others are utilised for the production of a kind of brandy, called Mescal, or Mexical. The so-called "Pulque Maguey," which bears leaves up to 100 lbs. weight each, is the plant mostly used for the purpose of producing

pulque, but many other varieties of the Agave family are also utilised, such as the Agaves: *Americana*, *Scolymus*, *Prostrata*, *Potatorum*, etc. Some descriptions of Agave are specially utilised for the production of "mescal"—I mention *Aurea* and *Fequilana*. The pulque is not only produced in enormous quantities for drinking, but is also used for distilling purposes.

Analysis of the juice of the Pulque Maguey is reported as showing as follows:—9·553 sugar, 0·540 gums, 0·726 salts, 89·181 water, etc.

Instead of entering into a full account of the methods current in Mexico of obtaining the juices from the plants above mentioned, I limit myself to pointing out that these juices, whether obtained from the stems or the leaves, contain a large amount of sugar in varying quantities, thus rendering them very suitable for the distillation of alcohol.

THE PRINCIPAL VARIETIES.

Botanists affirm that there are 185 varieties of the Agave family, and of these about fifty varieties are well known. There are about fifteen varieties of the *Fourcroya*, and twelve varieties of the *Sansevieria* growing in most tropical, semi-tropical, and other countries. It is not possible in an article of this description to give particulars of the relative values for manufacturing purposes of the many varieties of these plants. The value of their juices for distilling purposes depends not only on the nature of the plants, but also on the nature of the soil, the climate, the range of temperature, the elevation of the place of growth, etc. The value of their fibres is well known or easily ascertained.

A few remarks respecting the growth of these plants may be interesting. (1) In some countries the plants I have mentioned and some others are now largely and successfully cultivated, solely for the valuable fibres they contain. The cultivation and the extraction of their fibres is becoming an ever-increasing and profitable business. (2) In some countries certain of these plants are cultivated mainly because of their valuable protective nature. Thus, in India the *Agave Americana* and *Vivipara* are used to form impenetrable fences for the protection of railways and of enclosures generally, and for preventing the travelling or transference of sand and surface soil by the hot winds. The leaves of these plants can be cut from time to time and utilised for the production of fibre and industrial alcohol. (3) In other countries, one of which I instance, viz., the Mauritius, the *Fourcroya Gigantea* grows wild on barren shores and on land where nothing else will grow. It is not cultivated, but simply harvested. The crops of leaves are cut and gathered whenever it suits the convenience of the owners or buyers of the leaves, who have factories for the extraction of the fibre; the juice is not utilised at present. (4) In India, Africa, Mexico, Australia, and other parts of the world some of these plants, for instance the Agaves and *Fourcroyas*, grow wild in arid desert wastes, where scarcely any other plants can grow. They cover immense areas of rocky ground and grow at various elevations, say, from the plain up to 7,000 feet above the sea.

RECENT DEVELOPMENTS.

The plants growing on these wastes have generally been considered practically valueless for various reasons. Ignorance of the very valuable nature of the leaves and how best to treat them; the cost of harvesting, transporting, and treating the leaves; questions of labour, transport, water supply, etc.—all these, but principally ignorance, have discouraged enterprises which, to be thoroughly successful, should be on an important scale.

At the present time, in consequence of the ascertained fact that these leaves possess a double value (for fibre and alcohol), much attention is being drawn to the exploitation of these large areas of plant-covered land. Concessions and monopolies are being obtained with the view of realising the immense profits resulting from the obtaining of two very valuable products from the same raw materials. These profits justify the use of improved methods of transporting the leaves with great economy to central works by the use of special trucks or wagons running on roads or light rails, and hauled by tractors driven by alcohol.

In most countries alcohol is usually placed in Bond under varying conditions, and when intended to be used for motive power, fuel, light, or manufacturing purposes it undergoes a denaturing process, which renders it unfit for drinking. This process consists essentially in adding to the alcohol a substance soluble therein of a really bad taste or odour or both, and of an intensity which renders it impossible to use the mixture as a drink.

The denaturing material mainly used is Methyl Alcohol; there are many other materials (about thirty) which are equally effective. It is customary to add to 100 parts, by volume, of alcohol (not less than 90 per cent. strength) ten parts of approved methyl (wood alcohol) and one-half of one part of approved Benzine. This blend or mixture is classed by leading Governments as completely denatured alcohol.

Industrial alcohol is now being increasingly used with great efficiency and economy in many parts. The leaves and stems grow in country districts, the industrial alcohol is produced there, and is consequently very cheap. All kinds of engines, stationary, portable, for motors, for road and water transport, etc., can be driven by it. It is used for many industrial purposes; also for agriculture, such as for ploughing, harvesting, mowing, pumping water, sawing timber, grinding grain, etc. Industrial alcohol, 40° Cartier, can be used for all driving purposes.

Industrial alcohol is also being increasingly used for heating purposes; it burns with a blue flame, intensely hot and without smoke. Its odour is not disagreeable, rather the contrary: and consequently it is well adapted for heating houses and premises of all kinds, for cooking, coffee roasting, etc. Many important improvements have, as a consequence, been recently made in the construction of heating apparatus, cooking and other stoves, by adapting them for burning alcohol in a thoroughly practical and economical manner.

For illustration, alcohol is also proving itself very valuable and safe: the large and increasing demand for its special lamps has brought into the market many very practical improvements.

ALCOHOL FOR MOTIVE POWER.

The following notes concerning the application of industrial alcohol for motive purposes may be interesting, this being the most important of its present uses. Alcohol produced at 7d. to 9d. a gallon is a most valuable source of power, especially in distant country districts, where other fuels are obtainable only at much higher prices. Alcohol is *far less dangerous* than gasoline, and there is a marked advantage in its use, seeing that higher compression pressure may be used without pre-ignition, this tends to increase the efficiency of the engine; the expansion of alcohol, however, not being so great as that of mineral spirit, power is slightly affected. Alcohol engines are nearly all of vertical construction, and can be run equally well with gasoline. Alcohol works as well as gasoline in a gasoline engine with slight modification of the carburettor, as alcohol does not carburet so easily "at starting" as gasoline. This latter becomes

volatile at a temperature of blood heat (98° F.), but a much greater degree of heat (158° to 176°) is necessary to volatilise alcohol rapidly enough for motor purposes.

Carburettors made to burn alcohol are furnished with a simple heating apparatus, using the exhaust of the engine to supply sufficient heat to the vaporising chamber to suit alcohol. Alcohol of 40° Cartier is well adapted for alcohol engines. One pint per hour per horse-power is stated to be the average consumption of alcohol. The same remark applies to gasoline, not exceeding 88° nor less than 62° of gravity. Engines for alcohol fuel are usually constructed with a single cylinder up to 20 h.p.; with two cylinders up to 40 h.p.; above 40 h.p. triple cylinders are used.

In cases where a variety of fuels may be expected, the carburettors are so made that they work equally well with alcohol, petrol, or kerosene by arranging for different degrees of heat in the vaporising chamber to suit the different fuels. Important improvements have recently been made in this direction in order to produce engines capable of working well and economically with a variety of fuels.

ALCOHOL PRODUCTION PROCESS.

A few remarks respecting the processes of producing alcohol from the juices of the leaves and stems and the extraction of their fibres may be interesting. To produce alcohol the leaves and stems are first passed through a special crushing and juice-extracting machine, which performs three operations. It slits the leaves into longitudinal strips, the smaller ones being slit up in the centre, while the larger ones are slit into four strips. In passing through its three pairs of large brass rollers the leaves and stems are not only crushed with great pressure, but the upper and lower skins are simultaneously scraped by a special arrangement, so as to facilitate the flow of juice and the subsequent extraction of the fibres. The juice, after being prepared, is then distilled. Special continuous-working steam stills are used for distilling the alcohol in one operation in a simple and economical manner with a minimum of fuel and water. These stills are simple in construction, easy to erect, and capable of being worked by an ordinary intelligent mechanic. They exhaust entirely all the spirit from the wash, and produce alcohol of the highest commercial strength. They are constructed of many sizes—small, medium, and large—up to the production of several hundred gallons of pure alcohol per hour. With each still are supplied full details and instructions for working the process. The cost of producing the alcohol is very small. It is, of course, governed by various matters, such as the quality of the juices, the cost of fuel, labour, etc., and the size of the installation; the larger it is, the smaller the cost of producing alcohol.

NEW FIBRE PRODUCTION PROCESSES.

The crushed leaves, strips of leaves and stems from which the juices have been extracted are soaked, thoroughly washed by special machines, and freed as far as possible at this stage from non-fibrous matters, such as pith, bits of skin, etc. They are then placed in a vertical kiers or boilers, specially constructed for treating their contents in the most efficacious and gentle manner, in order to soften and remove the gums, loosen the remaining non-fibrous matters, and to free and clean the fibres. This is effected partly by boiling them in hot water with very weak chemical liquors under high steam pressure. Whilst still in the kiers, the fibres, after boiling, are thoroughly washed with hot and cold water. The liquors, likewise the hot and cold water, are caused to circulate *continuously*

through the fibres in the kiers. It is by reason of the high pressure used in boiling and of the constant circulation, that the chemical liquors used are of the weakest, so as not to damage the fibres, either as regards their strength, colour, or ductility.

After removal from the kiers, the fibres are again specially washed; then dried in the open air or in a special fibre-drying apparatus, so constructed that it dries large quantities of fibre quickly, not so much by great heat as by copious currents of dry air, so as not to affect the quality of the fibres.

In some cases they undergo a brushing operation before packing into bales. This brightens the fibres and materially increases their selling value.

The effect of treating the crushed leaves, strips of leaves, and stems, from which the juice has been previously extracted by this process, is threefold:—

- (1) It extracts from them very economically the full amount of fibres which they contain.

- (2) The fibres extracted are strong, bright, clean, ductile, and of good colour and quality.

- (3) Special attention is called to the fact that there is no appreciable loss or waste of fibre by this process.

A complaint frequently heard in connection with the working of most of the modern, powerful, quick-running, fibre-scutching machines is the serious loss of good fibre resulting from the system and the immense speed of their scutching process. This loss varies from ten to twenty per cent.—in some cases even more.

The saving of fibre by the new process more than pays for the cost of extraction in most cases. In other cases, after allowing for the increased quantity of fibre produced, the cost of extraction is brought down to quite a nominal figure. Stress is again laid on the fact that the raw materials used in this process are a by-product of the alcohol process.

Complete installations of the machinery and plant for treating the crushed leaves, the strips of leaves and the stems, and for producing the fibre ready for market can be obtained, together with full particulars of the process.

SIZE OF INSTALLATIONS.

I do not advise the installation of combined alcohol and fibre-producing works on a very small scale, because economy of production must be considered. Medium and large-sized installations work much more economically than those of small size, as regards fuel, power, chemicals, labour, supervision, etc.; the larger the works the cheaper the cost of producing alcohol and fibres. The quantity of leaves and stems at disposal or obtainable in a given time and the amount of capital involved are leading factors in deciding on the size of the installation. It is a simple matter so to arrange the installation for both processes that it can be easily increased in the future.

In districts where the leaves and stems are available, growers and landowners can advantageously combine to form a company or to sell and deliver their leaves and stems to central works for treatment.

In considering the size of the proposed installation, persons interested in the matter should bear in mind that the machinery and plant used for the two combined operations can also be separately utilised. Thus, in the case of certain leaves and stems containing plenty of juice suitable for distilling and no fibre worth extracting, the first part of the installation can be used, as also for ordinary distillation from grain, etc. There are also certain leaves and stems that contain very valuable fibres, but little or no

juice suitable for distilling. In this case, the second part of the installation can be utilised. The matter is simple, and there is no occasion for any risk being run. Information can be obtained respecting the value of the juices for distilling purposes and the value of the fibres. The best method is to prepare samples of the juice, expressed from the leaves or stems, and then to obtain an expert analysis of them in order to prove their suitability or otherwise for the economical production of industrial alcohol.

Care should be taken that the juices do not come in contact with iron. They are often very acrid and liable to be affected by contact with iron. If the samples have to be sent some distance for analysis it would be better to put them in glass bottles.

As regards the fibres, it is an easy matter to obtain samples by hand labour and to submit them to experts for valuation; the quality of the fibres and their prices can thus be ascertained. The percentage of fibres in the leaves and stems is also a very important matter. It varies exceedingly, and can only be ascertained by carefully weighing the quantity of raw material treated and by afterwards weighing the dry fibre extracted so as to ascertain the percentage.

Several important installations are now under consideration, and it is hoped that these remarks will be of widespread interest and usefulness.

CORRESPONDENCE.

Home-made Soap.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—An enormous quantity of caustic soda of various brands is imported into this Colony every year, and sold to farmers and others. The statements printed upon the labels of the tins in which the soda is sold are, in many cases, distinctly fraudulent, and anyone who bases his calculations of possible profit thereon will be grossly disappointed. I enclose a label taken from a tin of "Thistle Brand," which, as you will see, advises you to "Make your own soap," and adds that "Each pound of this caustic soda will make 12½ lbs. of best hard soap."

Then follow the "Directions," from which it appears that, in order to make the abovementioned 12½ lbs. of best hard soap you are to use, in addition to the 1 lb. of caustic soda, 7 lbs. of "clean grease, lard, or tallow," and 1½ (one and a half) quarts of water. It will, therefore, be seen that the total weight of all the ingredients amounts to only 11½ lbs., as follows:—

1 lb. of caustic soda weighs	1 lb.
7 lbs. of grease weigh	7 lbs.
1½ quarts of water weigh	3 lbs. 12 ozs.
Total	11 lbs. 12 ozs.

So that, allowing nothing at all for evaporation and wastage, there will be a shortage of just 6 lbs. on every 100 lbs. of the anticipated output of soap; a sufficiently large percentage to wipe out any satisfactory profit.

As a matter of fact, the soap resulting from the use of 1 lb. of caustic soda, as directed, weighs, when cut up a day or two after it was made, considerably less than 11½ lbs., and when it has become "best hard soap" by "being kept a month," as directed, it will weigh less still.

Cannot something be done to prevent fraudulent statements of this kind in connection with an article of such every day use as caustic soda, and also to compel the manufacturers to indicate clearly on the labels the extremely dangerous nature of the contents (to which serious accidents are frequently due)?—Yours, etc.,

CAUSTIC.

Hand-Power Threshing Machine.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Can any of your readers kindly give me some information regarding the abovementioned machine?

I have found a difficulty in obtaining a good, serviceable hand-power machine for threshing wheat. I have received particulars of two machines from well-known firms, but from their description, to my mind, they would be far from satisfactory, as both machines deliver straw and corn together. The old-fashioned method of tramping is superior to that, for with the latter method one does obtain chaff. What I require is a machine which will deliver corn and chaff separately, so that the corn can be bagged as it leaves the thresher. If any of your readers, experienced in this connection, will kindly reply to this letter through the medium of your next publication, I shall be extremely obliged.—Yours, etc.

F. M.

Barkly West, March 28.

LEAVER'S



BRAND.

The Ideal Winter Dip
There is no necessity to separate the lambs from the ewes after dipping
Leaver's Tobacco Extract
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EAGLE BRAND

LEAVER'S



BRAND.

The Clarification of Honey.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the February issue of the *Journal* a recipe is given by a correspondent under the *nom de plume* of "Ichneumon" for the clarification of honey, which, I trust, Mr. Carter, of Ashton, and others have not put into practice, certainly not with any great quantity. Mr. Attridge, the Government expert, says, and I think rightly, that he knows of no process for that purpose. Surely any beekeeper of "Ichneumon's" pretensions, judging from his criticisms and writings in the past, knows that if honey be raised to the temperature of boiling point—let alone diluting the same with boiling water and a subsequent evaporation of the dark yellow, wine coloured fluid—the flavour and colour of the honey is injured. The honey has, in fact, undergone a chemical change, and is honey no longer. 160° Fahr. or 71° Cent., and hardly that, is the temperature to which honey may be raised with safety, and that to prevent candying or granulating.

I would have written sooner, but made sure that some correspondent or "one in authority" would have sounded the "caveat" sooner.—Yours, etc.,

W. T. HUGH WILSON.

Hopefield, 23rd March. 1910.

The Eradication of Scab.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I notice that at the recent Afrikaner Bond Congress, which has taken place at Beaufort West, a discussion on the merits of the different Sheep Dips arose, but no one mentioned Tobacco Dips. I am very surprised at this, because undoubtedly Tobacco Dips are the best for eradicating Scab in South Africa, or any other country throughout the world.

In this connection it is interesting to notice the following extract from the report of Mr. Bruce, late Chief Inspector of Sheep, New South Wales (Australia) "Millions of sheep have been permanently cured of Scab in Victoria, South Australia, and New South Wales; hundreds of thousands of scabby sheep have been cleansed with Tobacco Extract and Sulphur. In fact, this dressing has the credit of having eradicated Scab from the flocks of Australia."

From the above it is quite clear that Tobacco Extract and Tobacco Extract and Sulphur played a very prominent part in eradicating Scab from the Australian Colonies, and placing the sheep industry there in the premier position it holds to-day.

If one turns to the United States of America, one finds an equally wonderful record of the high efficiency of Tobacco Extract and Sulphur as a cure for Scab.

For the term of five years (1900 to 1905), during which the United States Bureau of Animal Industry kept and published a record of the dippings conducted under the supervision of the Government Inspectors, the results are both interesting and instructive to all engaged in the Sheep and Wool Industry.

These records show that the highest honours were handsomely won by Tobacco Extract and Sulphur, both as regards the highest average for the entire period of five years, and the highest average for any one year.

For those interested in the exact figures, the details are as follows (the number of sheep dipped having reference only to those dipped under Government supervision and to sheep infected with and exposed to scabies):—

AVERAGE OF ENTIRE FIVE YEARS.

	Effective. Per cent.	Sheep dipped. Number of
Tobacco Extract and Sulphur...	93.72	5,215,991

AVERAGE FOR THE LAST THREE YEARS.

	Per cent. Effective.	Number of Sheep dipped.
Tobacco Extract and Sulphur...	97.53	4,901,996

For the last year of the period Tobacco Extract and Sulphur again attained the highest honours, with the hitherto unequalled average of 99·85 per cent. effectiveness on a total, under Government supervision, of 2,331,631 sheep.

In 1903 there was a serious outbreak of Scab in North Wales (Great Britain), and the British Government appointed a Commission to inquire into the cause of the outbreak and to ascertain the best remedy. Sheep farmers from New Zealand, South America, South Africa, Ireland, Scotland, Wales, and England all gave evidence before this Commission, and as a result of the information obtained, the Commission recommended Tobacco and Sulphur as the best Dip for cleansing purposes.

During the 1908 Session of the Transvaal Parliament, General Louis Botha, in reply to a question put to him in the House, made the following statement:—"Sheep Dips manufactured from tobacco are excellent for the eradication of Scab in sheep and goats, and the nicotine has no deleterious effect on the wool."

The Principal Veterinary Surgeon for the Transvaal Government, in his "Farmers' Bulletin," No. 76, 1909, strongly recommends Tobacco Extract and Tobacco Extract and Sulphur, because it eradicated Scab from Australia.

The Orange Free State Government officially recommends Tobacco Extract and Tobacco and Sulphur as certain cures for Scab.

In 1899 the Cape Government appointed a Select Committee of the two Houses of Parliament to inquire into the work of the Scab Legislation, with the result that, in the Amended Scab Act of 1899, Tobacco Extract was especially recommended as a highly efficient Sheep Dip.

On the Continent of Europe the record of Tobacco Extract as a curative is equally good, and we find many scientists and farmers strongly recommending all sheep owners to use nothing but tobacco preparations for dipping purposes.

In fact, it would seem that there is no other kind of Sheep Dip which has received such universal approval throughout the world as Tobacco Dip, and every farmer in South Africa should strongly advise the Union Government to adopt this remedy as the official preparation for eradicating Scab.

If this is done, then the Scab Disease, with all its attendant annoyances and expense to the flock owner, will soon be a thing of the past, as it is in Australia to-day, and the value of the wool will be increased by its use, for a well-prepared Tobacco Extract will add gloss, strength, and staple to the wool fibre, instead of rendering it brittle and useless for manufacturing purposes, as is the case with certain crude sulphur compounds which are used in some districts.—Yours, etc.,

"COLONIST."

We can only refer our correspondent to an article that appeared in the *Agricultural Journal* in September, 1909—(Vol. xxxiii, No. 3, page 377)—entitled "The Great Dip Controversy." If he will study that carefully he will learn something interesting on the whole question, especially with reference to his last paragraph.—Editor, *Agricultural Journal*.

Another Prickly Pear Exterminator.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I notice in your February issue an article on an experiment with an extirpator of prickly pear in the district of East London. I also notice that the price of same is 3s. 6d. per gallon. It seems also that the spraying of it will injure the veld. I will give a much easier plan. For a small remuneration I am prepared to send a recipe, which will reduce the price of the poison to 4d. per gallon, and to 3d. if the necessary bushes are to be found on the farm. In every branch of a tree a cut has to be made and about a tablespoonful of the poison poured into it. For a small tree one cut is sufficient. I am prepared to reply to any letter on the subject, and also to send the recipe with a guarantee that if the prickly pear does not die I won't ask for payment.—Yours, etc.,

Oudepost, Aberdeen, C.C., 8th March.

L. D. OOSTHUIZEN.

Sickness in Ostrich Chicks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In reply to the many farmers who have to combat the many diseases in young ostriches, I also would like to give my experience. Firstly, from what I have seen I would advise never to camp a pair of birds from the same brood. I have seen them hatch nine chickens, not a single one of which was not crippled or defective in some way. Secondly, I once lost during one year seventy young birds out of seventy-three, the one suffering from liver disease, the other from fever; I then considered the matter, and came to the conclusion that the fault was with the start; and such was the case. My laying birds have the run of sour camps. As soon as they start making a nest I begin to feed them with cabbage, in addition to the dry fodder (for the purpose of cleansing the old birds); a couple of days before they cease laying I discontinue giving cabbage, in order that they may be hatching well; about eight days before the chickens are hatched I feed the old birds again on cabbage or lucerne, so that their excrement may be cleansed, and leave the young ones with the old birds for ten days. As we all know, the young ones live on the excrement of the old ones for the first couple of days. The old ones then provide them with warm, healthy manure, which we cannot give them. It is now a considerable time that I have followed this course, and I have not lost a single young bird through disease. Thanking you in anticipation—Yours, etc.,

J. D. BENEKE.

Ruitersbosch, 15th March.

The Poison Dispute.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Such a great deal is being written about the Red Poison, because Mr. Visagie has stated that the poison last bought by him in 1908 was bad; this fact cannot be denied. In 1902 I bought a small bottle at 2s. 6d.; this poison is really as good as one can desire. In 1908 I bought again of the same poison, paying again 2s. 6d.; this is as bad as bad can be. The Government does not make the poison, but has it done, and those who make it are but human, just like other folks. In the preparation and weighing of the stuff so much of one ingredient is used, and so much of another. How easily may a mistake be made in the preparation, by which a weaker poison is the result; and the Government is not at all to blame for this. Mr. P. J. van Zyl alleges that he administered poison in one way, and Mr. J. J. Claase in another. If poison is good you may give it in any way you like, but the animal that picks it up dies. So it is not the method of administering, neither is it the Government which is to blame, but the manufacturer, and nobody else.—Yours, etc.,

P. J. C. VAN ZYL.

Poortje (Van Zyl's Hoop), 7th February, 1910.

The Plague of small Birds.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—The birds, like "mossies" and finches, have become a plague to the grain farmer, so much so that it is high time they should be reduced in numbers. We expect that all grain farmers during the coming ploughing season will plough half an "akker" on every Saturday night and sow on the untilled half grain mixed with poison. The birds will then have time on the following Sunday to pick up the

poison. For one sowing 25 lbs. of wheat or 40 lbs. of oats will be required. Will you kindly write us what kind of poison will be the most suitable for this purpose, and what quantity of poison has to be mixed with the wheat and oats respectively?—Yours, etc.,

M. A. BLANCKENBERG.

Roodekleigat, P.O., Malmesbury.

We have no first hand experience on this subject, and would suggest that some of our readers give the results of efforts in this direction. The following is recommended by an American authority:—Dissolve arsenite of soda in warm water at the rate of 1 oz. to the pint; pour this upon as much wheat as it will cover (in a vessel which can be closed, so as to prevent evaporation), and allow it to soak for at least 24 hours. Dry the wheat so prepared, and it is ready for use.—Editor, *Agricultural Journal*.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

Wanted,—Situating as Farm Manager or Overseer. Thorough knowledge of ostriches and lucerne culture. Can level lands scientifically. Can furnish good references.—H. L. RAYNHAM, P.O., Bayville, District Uitenhage, C.C.

Englishman, strong and healthy, 24 years of age, is anxious to secure employment on a stock farm in the Colony. Willing to give services for one year in return for board and lodging.—Reply. DR. C. WATSON, Mayfield, Sale, Cheshire, England.

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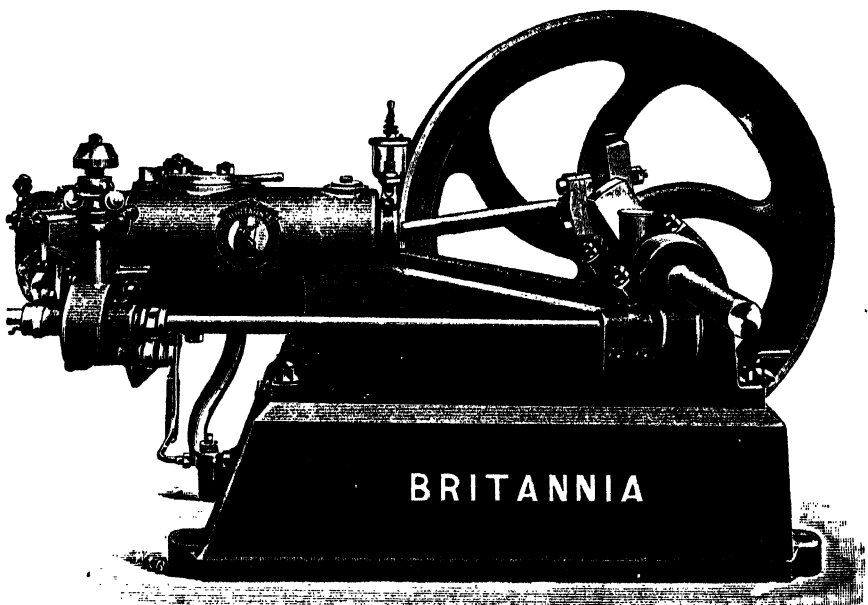
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NOTES ON THE WEATHER OF FEBRUARY, 1910.

By CHARLES M. STEWART, B.Sc., Secretary to the Meteorological Commission.

Mean pressure lower than usual, with a mean temperature above the average in the South-West but mostly below the normal over the rest of the country; frequent and severe thunderstorms, with a few destructive hailstorms; clear skies in the South-West but heavily clouded elsewhere; a subnormal rainfall in the West, over the Cape Peninsula, in Bechuanaland and Rhodesia, with abnormally heavy precipitation over practically the whole of the rest of the country, averaging three-quarters more than the usual depth; a fog frequency slightly less than usual, with a few strong winds, but an entire absence of frost, dust storms and hot winds; such were the most noteworthy features of the weather of February, 1910.

DIVISION.	Mean Rainfall (1910).	Mean No. of Days.	Average Rainfall (1891- 1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula	0.51	4	0.77	3	-0.26	- 34
South-West	1.27	3	0.48	2	+0.79	+165
West Coast	0.24	2	0.28	1	0.04	- 14
South Coast	6.04	12	1.68	6	+4.36	+260
Southern Karoo	2.57	7	0.71	2	+1.86	+262
West Central Karoo	2.15	7	0.96	3	+1.19	+124
East Central Karoo	2.53	7	1.57	5	+0.96	+ 61
Northern Karoo	3.58	9	1.72	4	+1.86	+108
Northern Border	2.20	6	1.83	5	+0.37	+ 20
South-East	6.27	13	2.80	7	+3.47	+124
North-East	6.32	14	3.05	8	+3.27	+107
Kaffraria	6.86	15	3.52	9	+3.34	+ 95
Basutoland	4.73	12	3.94	10	+0.79	+ 20
Durban (Natal)	...	...	4.50	...	...	...
Bechuanaland	2.53	8	4.23	8	- 1.70	- 40
Rhodesia	4.45	13	7.97	13	- 3.52	- 79

Precipitation on the mean of 371 stations amounted to 4.15 ins. on 10 days, being 1.81 ins. or 78 per cent. above the average. This amount is 1.86 ins. above that for January last and 0.61 ins. more than the corresponding quantity for February of 1909. Compared with the normals, the mean sectional rainfall was much greater than usual over eleven of the fifteen rainfall divisions, being two to three times the usual quantities over seven sections, the percentage excess varying between 262 per cent. over the Southern Karoo and 20 per cent. over the Northern Border and Basutoland. The actual excess was greatest (4.36 ins.) over the South Coast and least, 0.37 ins., over the Northern Border. There was, however, a deficiency of rainfall over Rhodesia, Bechuanaland, the Cape Peninsula and the West Coast, ranging from minus 79 per cent. over the first to 14 per cent. over the last of these four. In comparison with last month the amounts registered show increased quantities in all the sections with the exception of Basutoland and Bechuanaland; whilst, compared with February, 1909, the means for this month were in excess of the amounts then registered except over the West Coast, Northern Karoo, Northern Border, Basutoland, Bechuanaland and Rhodesia. Summarising the monthly totals, it is found that of the 371 stations only three (3) in the West Coast suffered from absolute drought, and 33 from partial drought, having from 0.01—0.50 ins. during the month; of the remainder, 39 had 0.51—1.00 ins.; 38 had 1.01—2 ins.; 37 had 2.01—3 ins.; 43 had 3.01—4 ins.; 80 had 4.01—6 ins.; 53 had 6.01—8 ins.; 28 had 8.01—10 ins.; 10 had 10.01—11 ins.; 2 had 11.01—12 ins.; 3 had 12.01—13 ins.; Katberg had 13.65 ins., and Evelyn Valley 15.55 ins. The three having between 12 and 13 ins. were: Insikeni, 12.10 ins.; Bazeya, 12.23 ins.; Stormberg Junction, 12.67 ins. Although the totals registered were so large at so many stations, the

number of days on which rain fell were also largely in excess of the average over practically all the divisions, so that it is not very surprising to find that the maximum amounts registered in 24 hours were by no means exceptionally large, the heaviest fall in one day being 4.16 ins. at Vogel Vlei on the 11th, and Kolongha coming next with 4.02 ins. on 10th. Of 363 stations furnishing details, it is found that 69 had 0.00—0.50 ins. as the maximum one-day precipitation; 90 had 0.51—1.00 ins.; 152 had 1.01—2 ins.; 43 had 2.01—3 ins.; 7 situated in the South Coast, South-East and North-East divisions had 3.01—4 ins.; and the two (2) already mentioned were the only stations with more than four inches. Although the daily falls were by no means abnormal, some heavy downpours in short intervals were recorded; thus at Middlecourt on 11th 1.03 ins. fell in 25 minutes, or at the rate of 2.47 ins. per hour; again at the same station on 23rd 1.22 in. fell in 30 minutes, i.e., at the rate of 2.44 ins. per hour; also at Lady Frere 1.19 in. fell between 6.15 and 6.50 p.m., that is, at the rate of 2.04 ins. per hour; at Mount Ayliff on 24th 1.20 ins. fell in 40 minutes, or at the rate of 1.80 ins. per hour; at Ida on 11th 1.10 in. in 30 minutes, or at the rate of 2.20 ins. per hour; at Bedford on 5th, 0.64 ins. fell in 10 minutes (1.50 2 p.m.), rate 3.84 ins. per hour, and on 23rd, during a thunderstorm, 2.58 ins. fell from 3—6 p.m. In consequence of the continuous nature of the rain over so many days, the veld and grass in most places are reported to be in excellent condition, dams are mostly full and fountains and rivers strong. Unfortunately the swollen state of the rivers caused several deaths by drowning, in the Transkei; the postal service was disorganised at times, the Umata river, for example, being stated to have been uncrossed practically the whole month. In Bechuanaland the veld and mealie crops have made excellent progress, mealie fields planted barely two months ago being seven feet tall. Many dams were broken in the Albert division, the mealie crop at Fort Beaufort is being destroyed by worms and white rust, lucerne at Carnarvon Farm lay for three weeks on land till next growth was 6—9 inches high, and stock in some areas are suffering from the dampness. There is reported to be a good crop of fruit at Clifton (Sterkstroom) and that in the Wellington division is said to be fair, notwithstanding the havoc wrought by the "South-Easter" in November last. *Thunderstorms* were of unusual frequency and severity during the month. 776 such storms occurring on 26 days of the month, more particularly from 2nd to 5th, 7th, 11th, 16th, 17th, 23rd, 24th, 27th, and 28th, but most widely on the 28th. The number of these storms is more than twice that reported in February of last year and about half as much again as in January last. Several fatalities from lightning are stated to have occurred in the neighbourhood of Umtata. *Hail* fell at 28 stations on 10 days, chiefly on 23rd and 24th. A destructive hailstorm is reported to have occurred in the neighbourhood of Algeria (Clanwilliam) on the 11th, causing the loss of practically all the tobacco crop on some farms, the stones being stated to have been of the size of turkeys' eggs in some places. Two severe hailstorms are also reported to have passed to the south of Umtata, causing considerable damage to crops and young trees. Some hailstones at Lady Frere on 23rd measured 3 ins. in length by $\frac{1}{2}$ ins. breadth. No *Snow* or *Sleet* during the month.

Temperature, Cloud, and Wind.—Temperature has started on the down grade a month earlier than usual this year. The mean value for all stations during February last being 68.3° or 0.6° lower than in January, and 0.2° lower than in February, 1909. The mean maximum (77.6°) is 1.2° lower than last month and 0.8° below that for January of last year; while the mean minimum (59.0°) is the same as during January but 0.4° higher than during the corresponding month of last year. Compared with the normals, the mean monthly temperature was 0.7° lower than usual, the day temperatures being 1.4° below the average, but the night temperatures only 0.1° less than usual. The monthly temperatures were above the average over the West and South-West and at a few stations in the South and East, on or near the coast, the excesses ranging from 1.5° at Royal Observatory to 0.1° at East London; the mean at Hopefontein (Rhodesia) was 1.6° higher than usual. Over the remaining stations temperature was lower than usual, mostly by 1—2 degrees, but varying between 4.4° at Rietfontein and 0.1° at Storms River. Similarly the day temperatures were higher than usual in the West, South-West, and one or two stations elsewhere, mostly by more than a degree, the excess varying however between 3.3° at Uitenhage and 0.2° at the Devil's Peak. Elsewhere the days were colder than usual, commonly by 1—2 degrees, the deficit however ranging from 6.5° at Bedford to 0.3° at Cape Agulhas and Hopefontein. The nights were warmer than usual, mostly by 1—2 degrees in the West and South-West, and at some stations in the South, and by a few tenths of a degree at a few places in the South-East and Kaffraria. The excesses varied from 3.3° at Hopefontein to 0.0° at Kokstad, and the deficits from 3.3° at Cape Agulhas to 0.6° at Bedford. The mean daily range (18.6°) was 1.2° less than during the previous month and during February of 1909. The mean warmest station was Mochudi with a temperature of 74.2° and the mean coolest, Disa Head (Table Mountain), with 61.7°, a difference of 12.5°. The highest mean maximum of 86.1° belongs to Mochudi and the lowest mean minimum of 51.9° to Hanover.

The highest temperature for the month were registered on sixteen days of the month, viz., 1st to 4th, 6th to 10th, 14th to 16th, 18th, and 25th to 28th, but most widely on the 7th; the lowest temperatures were recorded on thirteen days—1st, 2nd, 10th, 13th, 18th to 21st, 23rd to 25th, 27th and 28th, but mostly on the 19th. The mean value of the highest readings (91.6°) was 0.8° lower than in January, but 1.5° higher than in February of the previous year; whereas the mean of the lowest values (49.7°) was the same as in January but 1.3° higher than during the corresponding month of the previous year. The mean monthly range (41.9°) was therefore 0.8° less than during the preceding month, but 0.2° more than in February, 1909. The extreme readings for the month were 104.8° at Uitenhage on the 7th and 40.0° at Hanover on 20th, 21st and 23rd, yielding an extreme monthly range of 64.8° over all stations. Temperatures of 100° Far. or over were recorded at four (4) other stations. No instance of the occurrence of *Frost* was noted during the month. At Retreat (Cape Peninsula) the mean temperature on grass was 55.4° or 5.4° lower than the mean minimum in shade, ranging from 61.2° on 1st to 40.7° on 10th.

The mean percentage of *Cloud* was unusually high, being 52 per cent. or 11 per cent. more than during January, and only 2 per cent. less than in February of the previous year. The skies were most obscured over Kaffraria, the South-East and the South Coast, where the mean varied from 62 to 59 per cent.; the least amount of *Cloud* was experienced over Bechuanaland, South-West and Cape Peninsula, where the means varied from 22–36 per cent.; it increased northwards (to 60 per cent. at Port Nolloth), eastwards and inland, being 46 per cent. at Amalienstein and mostly about 50–60 per cent. in the interior. The means at the individual stations ranged from 18 per cent. at Groot Drakenstein, to 72 per cent. at Stutterheim and Port St. Johns and 79 per cent. at Hopefontein (Rhodesia). *Fogs* and *Mists* were slightly less frequent than usual, 113 instances being reported as occurring at one or more places on 27 days of the month, most numerous on 1st, 2nd, 8th to 10th, 17th, 18th, 25th and 26th. The prevalent morning *Winds* were Northerly at Port Nolloth, Southerly (S.E. to S.W.) over the South-West and eastwards to Cape Agulhas; Northerly at Mossel Bay, Westerly along the coast to Port St. John's, and S.W. at Durban; over Kaffraria and Basutoland it was North-Easterly or Easterly, but South-Easterly elsewhere. The mean *Force* on the Beaufort scale was 1.98, corresponding to a mean velocity (in terms of the more recently determined equivalents) of 7.9 miles per hour. This velocity is slightly greater than in February of last year, but less than during the preceding month. The winds were strongest over the Cape Peninsula and the South West and decreased gradually eastwards and northwards to less than half in the interior. At the Royal Observatory the only winds between N. and W.S.W. were those from N.W., which were only about half the usual frequency; with this exception, the winds were confined to that portion of the compass between E.S.E. and S.S.W., the true Southerly winds being less frequent than usual, whereas the other directions showed a marked increase, particularly those from S.S.E. and S.S.W. These Southerly winds were much more moist than usual, depositing moisture on grass almost nightly. The mean force here was practically the same as the average, corresponding to a velocity of 7.8 miles per hour. No *Hot Winds* and no *Duststorms* reported. *Gales* were noted at 10 stations on 10 days. The mean atmospheric pressure at the Royal Observatory was equivalent to 29.94 ins. of mercury or 0.05 ins. less than the usual; it varied from 29.80 ins. on the morning of the 6th to 30.13 ins. on the morning of the 13th.

OBSERVERS' NOTES.

GROOT DRAKENSTEIN.—Mean temperature of month 1.0° above the average (10 years).

Rainfall of month, 0.62 ins. above the average of 17 years—about double the average.

KOKSTAD (Coyle).—A very wet month, rivers over their banks frequently, postal service disorganised at times. Several deaths by drowning—one of a European—have occurred at drifts. Enteric and diphtheria cases in town and district. Up to date 16.10 inches of rain have fallen this year—more than half our mean annual fall.

VRUCHTBAAR (Wellington).—With the exception of a few very hot days, this month was not so warm as usual, the nights being mostly cool. Harvesting grapes and wine-making in full swing in this district now. Crops fair, with the exception of those farms which suffered from the South-east storm in November last, where in some instances the crop of grapes is below half of last season's crop. More raisins will be produced in this district, of an excellent quality, than for the last dozen years.

- ALGERIA** (Clanwilliam).—A large amount of damage was done in this part of the district to tobacco farmers on the 11th, owing to very heavy hailstorm, said to be in places as large as turkey eggs. Some farmers have lost the whole of their crop of tobacco, and other farms in close vicinity have not been touched.
- KRUIS RIVER** (Uitenhage).—Ploughing in full swing on all farms in the neighbourhood.
- UITENHAGE PARK**.—The wettest February for ten years, but rainfall from the storms very local.
- VOGEL VLEI** (Mossel Bay).—Very little sunshine during month of February. Country and stock in fine condition.
- WAVERLEY** (Queenstown).—Lovely weather all this month; no wind, no hail, and no very hot days.
- KENHARDT**.—River is rising again (on 28th). Rain all over surrounding district, and the veld looks splendid; farmers are jubilant.
- FORT BEAUFORT**.—Every prospect of the mealie crop being destroyed by worms and white rust.
- CLIFTON** (Sterkstroom).—Abnormal rains. Stock, crops, and veld in splendid condition. Good crop of fruit.
- LYNDENE** (Albert).—Much rain has fallen this month. Many dams are broken. The veld and stock are in good condition.
- MIDDLECOURT** (Wodehouse).—This (8·57 ins.) has been the most rain registered in one month in last four years. Rivers and fountains very strong, and plenty of grass.
- SUNNYMEADE** (Albert).—Rain nearly every day. Stock suffering from too much wet. Dams mostly full. Hail very prevalent in these parts.
- THIBET PARK** (Queenstown).—Nice rains, but ground not properly wet.
- KOKSTAD**.—A great deal more rain fell in the district. The rivers are all swollen since last month. Many casualties by drowning, both Europeans and natives.
- TRENT KOP** (Maclear).—Heavy rain, as usual, in February here, and a large amount of thunder. Ground thoroughly soaked, and rivers have been strong or full nearly all the month.
- NOTTINGHAM** (Mafeking).—Although the rains are insignificant compared with last season's, the veld resembles one vast sea of rolling green, in which the stock, fat and torpid, daintily revel at their leisure.
- ARMADILLO CREEK** (Vryburg).—Rainfall (2·20 ins.), though considerably below the average, has fallen most opportunely. The veld is a wealth of luxurious grass in full seed, and mealie fields have made prodigious growth; fields planted barely two months ago are 7 feet high.
- UMTATA**.—Rainfall (6·57 ins.) considerably above average for the month. Thunderstorms have been rather frequent. Several very heavy storms passed over surrounding districts when no rain fell here. Two very severe hailstorms passed over districts to south of Umtata, and did much damage to crops and young trees, but little or no hail fell here. Strong winds, S.W. and N.E., prevalent, which is most unusual for this time of the year. Several fatalities are reported from lightning, which on one or two occasions was very vivid, and followed by deafening roars of thunder. The Umtata River has been uncrossed practically the whole month. Crops could do well with a few days' sun. Live-stock looking well.
- CARNARVON FARM**.—February, 1910, is absolutely a record for rain, grass, and water; 8·41 ins. is considerably more than double the average for last nine years. Grass has never been so luxuriant and seldom as rank in every form of vegetation. Fourteen, out of twenty-eight, rainy days. All dams full, and constantly running over. Veld "door slag." No end of germinated wheat. All badly-built stacks and ricks rotten, whilst threshing machines here were "on and off duty" every other day. Cattle fat; butter cheap and plentiful. Sheep and goats have fallen off considerably. Lucerne mowing a fiasco. Crops that should be cured in a week have lain three weeks on lands, till next growth is 6 inches to 9 inches high. Angry agents always complaining, but fail to advise a remedy. Locusts seemingly obsolete, locust birds obsolescent. "Where the carcass is not the eagles fail to gather together."

Year.	Rain.	Wind.	Frosts.	No Clouds.	Rainy Days.
1901	5·69	7	0	0	10
1902	3·49	1	0	0	11
1903	2·36	3	0	0	10
1904	2·94	2	0	0	14
1905	4·36	2	0	0	11
1906	2·11	2	2	2	8
1907	2·15	3	0	0	9
1908	0·88	12	0	0	8
1909	4·51	1	0	0	14
1910	8·41	3	0	0	14
Means	3·69	4	0·2	0·2	11

STATIONS.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ...	80·3	62·2	71·2	98·2	6	48·1	10
Cape Town (S.A.C.) ...	83·1	62·6	72·8	103·5	2	52·5	21
Do. City Hospital ...	79·9	60·1	70·0	96·5	2	52·0	28
Table Mountain (Disa Head)	69·3	54·1	61·7	86·2	2	46·5	19
Do. (Devil's Peak)	73·8	55·1	64·4	94·0	6	46·0	1
Blaauwberg ...	73·9	59·4	66·6	86·0	2	52·5	28
Wynberg ...	79·4	61·1	70·2	87·5	3	52·0	10
Groot Constantia ...	77·5	59·7	68·6	93·0	7	54·0	20 & 27
Retreat ...	78·5	60·8	69·6	88·4	6	49·6	10
Groot Drakenstein ...	85·2	62·2	73·7	101·0	6	47·8	10
Robertson Plantation ...	82·8	59·0	70·9	96·7	15	45·0	18
Elsenberg (Agri. College) ...	83·1	59·0	71·0	100·1	2	48·8	19
Danger Point ...	71·4	60·4	65·9	74·0	1, 3, 6 & 27	53·0	19
O'okiep ...	84·5	61·7	73·1	100·0	1	46·0	10
Port Nolloth ...	65·6	54·1	59·8	70·0	7 & 10	48·5	19
Van Staaden's ...	77·5	59·7	68·6	103·0	8	49·0	20
Storms' River ...	76·1	58·5	67·3	98·5	7	47·0	19
George (Plantation) ...	73·6	57·9	65·8	96·0	7	48·0	19
Cape St. Francis ...	70·6	61·2	65·9	76·0	7	53·0	20
Uitenhage ...	82·4	60·9	71·6	104·8	7	51·3	20
Concordia (Plantation) ...	75·2	59·6	67·4	99·6	7	49·0	19
Port Elizabeth ...	74·6	62·3	68·4	90·0	28	54·0	19
Mossel Bay ...	73·8	62·2	68·0	95·0	7	52·0	19
Heidelberg ...	77·3	58·8	68·0	99·0	7	49·0	19
Cape Agulhas ...	72·7	59·9	66·3	77·0	4	54·0	19
Amalienstein ...	83·5	60·2	71·8	99·0	3	44·0	19
Hanover ...	83·0	51·9	67·4	90·0	1 & 9	40·0	20, 21 & 23
East London ...	75·1	64·1	69·6	79·0	15, 18 & 26	58·0	20
Lovendale ...	81·1	62·0	71·5	100·0	7	50·0	20
Sydney's Hope ...	77·0	58·8	67·9	99·0	7	48·0	19
Bedford ...	77·3	57·2	67·2	95·0	16	48·0	2
Stutterheim ...	77·5	59·0	68·2	95·0	7	50·9	19
Evelyn Valley ...	73·5	53·9	63·7	90·0	7	44·0	19
Aliwal North ...	81·5	55·1	68·3	91·0	16	45·0	25
Rietfontein (Aliwal N.) ...	76·2	54·3	65·2	84·3	6	46·0	1
Kokstad ...	76·0	51·4	65·2	85·0	16	45·0	20
Mount Ayliff ...	80·1	58·0	69·0	93·0	16	50·0	19
Umtata ...	78·9	60·2	69·6	92·0	7	53·0	19
Main ...	76·2	57·9	67·0	91·5	7	50·2	19
Tabankulu ...	74·9	56·3	65·6	87·3	16	47·4	19
Teyateyaneng ...	78·8	66·9	72·8	84·0	7	62·0	23
Port St. John's ...	76·9	52·3	64·6	83·0	16	46·0	24
Mochudi ...	86·1	62·4	74·2	94·0	14	57·0	13
Hope Fountain ...	78·6	60·5	69·5	85·0	25	53·0	23
Means ...	77·6	59·0	68·3	91·6	...	49·7	...
Extremes ...	...	...	...	104·8	7	40·0	20, 21 & 23

RAINFALL, FEBRUARY, 1910.

I. CAPE PENINSULA :

INS.

Royal Observatory (a) 12in. gauge	0.39
Cape Town, Fire Station ..	0.37
Do. South African College	0.70
Do. Molteno Reservoir ...	0.54
Do. Platteklip ...	0.35
Do. Signal Hill ...	0.14
Camp's Bay ...	0.18
Table Mountain, Disa Head	0.19
Do. Kasteel Poort...	0.70
Do. Waai Kopje ...	0.98
Do. St. Michael's ...	1.05
Devil's Peak, Blockhouse	0.25
Do. Nursery ...	0.21
Woodstock (The Hall) ...	0.27
Newlands, Montebello ...	0.55
Kenilworth ...	1.00
Wynberg, St. Mary's ...	0.54
Groot Constantia ...	0.56
Muizenberg (St. Res.) ...	0.73
Cape Point ...	0.30
Blaauwberg Strand ...	0.30
Robben Island ...	0.41
Durbanville ...	0.92
Maitland Cemetery ...	0.14
Tamboes Kloof ...	0.28
Woodhead Tunnel...	0.63
Lower Reservoir ...	0.58
Maclears Beacon ...	0.72
Waai Vlei ...	0.84
Woodhead Dam ...	0.73

II. SOUTH-WEST :

Eerste River ...	0.59
Klapmuts ...	0.86
Stellenbosch, Gaol ...	0.88
Somerset West ...	1.02
Paarl ...	0.62
Wellington, Gaol ...	0.97
Groot Drakenstein, Weltevreden	1.20
Porterville Road ...	0.25
Tulbagh ...	0.64
Kluitjes Kraal ...	0.58
Ceres ...	1.93
Rawsonville ...	0.98
Caledon ...	2.38
Worcester, Gaol ...	0.90
Hex River ...	0.71
Karhmelks River ...	1.48
Lady Grey, Div. Robertson	1.41
Robertson, Gaol ...	1.66
Do. Govt. Plantation	1.47
Montagu ...	1.45
Danger Point ...	2.55
Elgin Plantation ...	2.13
Elsenberg Agricultural College...	0.60
Roskeen ...	3.75
Vruchtbaar ...	0.75

III. WEST COAST :

Port Nolloth (Lient. Barber)	0.00
Anenous ...	0.19
Klipfontein ...	0.19
Kraaifontein ...	0.07

III. WEST-COAST (*continued*) :

INS.

O'okiep ...	0.00
Springbokfontein ...	0.00
Concordia (Krapohl) ...	0.03
Garies ...	0.01
Lilyfontein ...	0.02
Van Rhyn's Dorp ...	0.01
Clanwilliam, Gaol ...	0.20
Kersefontein ...	0.34
Piquetberg ...	0.90
Hopefield ...	0.32
Algeria (Clanwilliam) ...	0.54
Cedarberg (do.) ...	0.54

IV. SOUTH COAST :

Cape Agulhas ...	0.57
Bredasdorp... ..	6.48
Grootvaders Bosch ...	7.09
Heidelberg ...	2.05
Riversdale ...	3.25
Vogel Vlei ...	5.70
Mossel Bay... ..	5.26
Gr at Brak River...	7.11
George ...	9.59
George (Plantation) ...	9.59
Woodfield (George) ...	10.43
Millwood ...	11.07
Sour Flats ...	10.15
Concordia ...	11.61
Buffel's Nek ...	10.73
Plettenberg Bay ...	3.42
Harkerville ...	8.20
Lottering ...	7.36
Witte Els Bosch ...	6.42
Humansdorp ...	4.32
Cape St. Francis ...	4.31
Witteklip (Sunnyside) ...	4.49
Van Staden's (Intake) ...	5.72
Do. (On Hill) ...	5.80
Kruis River ...	4.53
Uitenhage (Gaol) ...	5.13
Do. (Park) ...	4.58
Do. (Inggs) ...	4.84
Armadaale (Blue Cliff) ...	4.62
Port Elizabeth (Harbour) ...	4.05
Do. (Victoria Park) ...	5.43
Do. ("The Slip") ...	3.62
Shark's River (Nursery)...	3.99
Centlives ...	3.69
Edinburgh (Knysna) ...	8.61
Gamtos Station ...	3.74

V. SOUTHERN KAROO :

Ladismith ...	2.23
Amalienstein ...	1.79
Oudtshoorn ...	1.11
Vlaakte Plaats ...	2.98
Uniondale ...	4.74

VI. WEST-CENTRAL KAROO :

Fraserburg Road ...	1.41
Prince Albert ...	3.79
Beaufort West, Gaol ...	2.84
Dunedin ...	1.95

VI. WEST-CENTRAL KAROO : *contd.* INS.

Nel's Poort...	1 70
Camfers Kraal ...	1 92
Krom River ...	2 34
Roos Plaats ...	2 35
Lemoenfontein, Beaufort West ...	3 96
Merweville...	0 63
Baaken's Rug ...	1 21
Willowmore ...	3 01
Rietfontein ...	1 10
Steytlerville ...	1 89

VII. EAST-CENTRAL KAROO.

Aberdeen Road ...	0 98
Klipplaat ...	2 65
Winterhoek ...	3 66
Klipdrift ...	3 50
Kendrew, Holmes	1 82
Do.	1 38
Graaff-Reinet, Gaol	3 32
Do. (Eng. Yard)	2 99
New Bethesda ...	1 70
Rodebloem ...	2 24
Glen Harry ...	3 22
Wellwood ...	3 40
Do. Mountain	2 52
Bloemhof ...	3 67
Jansenville...	2 70
Rode Hoogte ...	3 66
Toegedacht ...	0 49
Klipfontein ...	2 25
Cranemere ...	2 22
Pearston ...	3 63
Middlewater ...	2 64
Somerset East, Gaol	3 52
Middleten ...	1 91
Spitzkop (Graaff-Reinet)	2 88
Grobelaar's Kraal ...	1 70
Gordonville (Graaff-Reinet)	2 52
Muchputfontein ...	1 72
Zeekoe River ...	1 98

VIII. NORTHERN KAROO :

Calvinia ...	1 15
Middlepost ...	2 68
Sutherland ...	0 42
Fraserburg...	1 50
Carnarvon ...	3 21
Brakfontein ...	3 30
Victoria West ...	2 88
Britstown ...	0 58
Wilbeeskloof ...	0 37
De Kruis (Murraysburg)...	2 14
Richmond ...	1 89
Hanover ...	3 88
Theefontein ...	2 30
Philippstown ...	1 44
Petrusville ...	2 41
The Willows (Middelburg)	4 59
Colesberg ...	5 35
Tafelberg Hall ...	5 04
Fish River ...	3 14
Varkens Kop ...	4 81
Craddock (Gaol) ...	4 45
Witmoos ...	4 77
Maraisburg ...	4 73
Steynsburg (Gaol) ...	4 45
Hillmoor ...	5 27
Tarkastad ...	5 88
Do. (Dis. Engineer)	5 93

VIII. NORTHERN KAROO (*con.*) : INS.

Drummond Park ...	3 96
Glen Roy ...	6 28
Waverley ...	7 35
Schuilhoek...	6 11
Vosburg ...	1 44
Zwavelfontein ...	2 58
Bultfontein ...	3 76
The Lands (Dassiefontein)	3 04
Hartebeestfontein ...	3 93
Hotweg Kloof ...	4 95
Thebus ...	4 86
Rieghtersfontein ...	2 66

IX. NORTHERN BORDER

Kenhardt ...	5 79
Upington ...	2 35
Prieska ...	1 01
New Year's Kraal...	2 22
Dunmurry ...	2 89
Karree Kloof ...	0 90
Griquatown ...	3 96
Douglas ..	4 21
Hope Town ...	1 37
Orange River ...	0 42
Newlands, Barkly West ...	1 38
Barkly West ...	1 00
Kimberley Gaol)...	0 65
Rietfontein (Gordonia) ...	1 78
Douglas (Vos) ...	4 38
Stoffkraal (Prieska) ...	1 41
Rocklands ...	1 66

X. SOUTH EAST :

Melrose (Div. Bedford) ...	2 64
Dagga Boer ...	3 14
Lynedoch ...	5 03
Alicedale ...	6 14
Cheviot Fells ...	5 44
Bedford (Gaol) ...	8 85
Do. (Hall) ...	8 39
Sydney's Hope ...	4 08
Adelaide ...	7 25
Atherstone ...	5 57
Alexandria ...	4 29
Fort Fordyce ...	7 25
Graham's Town (Gaol) ...	6 50
Heatherton Towers ...	3 33
Sunnyside ...	4 72
Fort Beaufort ...	8 14
Katberg ...	13 65
Balfour ...	7 94
Seymour ...	3 43
Glencairn ...	6 17
Lovedale ...	5 83
Port Alfred ...	3 03
Hogsback ...	10 02
Peddie ...	6 53
Exwell Park ...	6 03
Keiskamma Hoek ...	4 99
Cathcart (Gaol) ...	7 01
Cathcart (Forest)...	7 04
Cathcart (Station) ...	7 41
Thaba N'doda ...	5 09
Evelyn Valley ...	15 55
Thomas River ...	4 57
Perie Forest ...	8 48
Forestbourne ...	9 99
Isidenge ...	6 48
Kologha ...	9 43

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X. SOUTH EAST (continued) :

	INS.
King William's Town (Gaal) ...	3·47
Do. Do. (Dr. Egan) ...	5·20
Fort Cunynghame ...	6·44
Dohne ...	6·36
Kubusie ...	6·02
Quacu ...	7·11
Blaney ...	4·30
Kei Road ...	7·05
Berlin ...	6·39
Bolo ...	4·22
Fort Jackson ...	3·90
Prospect Farm (Komgha) ...	5·49
Komgha (Gaal) ...	6·68
East London West ...	5·05
East London East ...	6·77
Cata ...	5·50
Wolf Ridge ...	10·05
Dontsah ...	5·44
Mount Coke ...	4·90
Blackwoods ...	5·19
Albert Vale (near Bedford) ...	4·40
Kubusie (Dist. Engr.) ...	3·66
Amabele Junction ...	6·75
Inzileni (K.W.T.) ...	6·06

XI. NORTH-EAST :

Venterstad ...	4·46
Mooifontein ...	8·41
Burnley (Cyphergat) ...	6·04
Ellesmere ...	4·38
Molteno ...	7·92
Lyndene ...	6·88
Thibet Park ...	3·86
Sterkstroom (Station) ...	6·75
Do. (Gaal) ...	7·36
Rooklands ...	5·57
Aliwal North (Gaal) ...	4·50
Do. Do. (Dist. Engineer) ...	4·99
Carnarvon Farm ...	8·41
Halseton ...	8·05
Jamestown ...	8·40
Whittlesea ...	4·54
Queenstown (Gaal) ...	7·52
Rietfontein (Aliwal North) ...	8·35
Middlecourt ...	8·57
Dordrecht ...	8·24
Tylden ...	4·65
Herschel ...	4·96
Lady Grey ...	4·91
Lauriston ...	5·62
Lady Frere ...	10·80
Contest (Near Bolotwa) ...	5·44
Kellands ...	6·98
Barkly East ...	8·56
Blikana ...	5·12
Cliftonvale ...	4·90
Albert Junction ...	6·18
Queenstown (Dist. Eng'rs Office) ...	9·13
Hughenden ...	4·49
Glenwallace ...	7·25
Indwe (Dist. Eng'rs Office) ...	8·91
Bensonvale Inst., Herschel ...	6·67
Dordrecht (Dist. Engineer) ...	10·38
Lady Grey, Station ...	3·10

XI. NORTH-EAST (contd.)

	INS
Indwe (Collieries) ...	10·19
Stormberg Junction ...	12·67
Hopewell (Imvani) ...	4·32
Sunnymede (Div. Albert) ...	7·47
Clifton (Sterkstroom) ...	7·55
Edendale ...	6·75

XII. KAFFRARIA.

Ida (Xalanga) ...	8·86
Slaate (Xalanga) ...	9·23
Cofimvaba ...	6·62
Tsomo ...	6·69
N'qamakwe ...	4·48
Main ...	5·01
Engcobo ...	9·13
Butterworth ...	3·20
Woodcliff ...	8·79
Kentani ...	6·41
Maclear ...	6·64
Idutywa ...	2·49
Bazeya ...	12·23
Willowvale ...	8·94
Mount Fletcher ...	4·79
Somerville (Tsolo) ...	4·76
Elliotdale ...	5·18
Umtata ...	6·57
Cwebe ...	9·06
Tabankulu ...	4·79
Mount Ayliff ...	5·98
Kokstad ...	5·37
Do., The Willows ...	6·68
Seteba ...	6·07
Flagstaff ...	5·18
Insikeni ...	12·10
Port St. John's ...	7·10
Umzimkulu ...	5·21
Maclear (Station) ...	6·36
Umzimkulu (Strachan) ...	5·70
Lusikisiki ...	8·14
Elliot ...	5·30
Tent Kop (Elands Height) ...	10·05
Elton Grange ...	6·15
Ugie ...	10·99

XIII. BASUTOLAND :

Mafeteng ...	4·28
Mohalies Hoek ...	3·69
Maseru ...	3·29
Teyateyaneng, Berea ...	3·09
Qacha's Nek ...	9·29

XIV. BECHUANALAND :

Taungs ...	1·84
Vryburg ...	3·39
Mafeking ...	2·86
Zwartkops ...	2·76
Nottingham ...	2·23
Masilibitsani ...	0·68
Armadillo Creek ...	2·20
Mochudi ...	4·25

XV. RHODESIA :

Hopefontain ...	4·64
Rhodes Matopopo Park ...	4·27

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40/-



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Diamond, 37/6

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PRODUCE MARKETS.

CAPE TOWN.

The Produce Department of R. Müller, Cape Town, reports for the month of March, 1910, as follows:—

Ostrich Feathers.—Local Sales and exports have recently been of normal extent, with a very good demand for all superior classes, whilst inferior goods were being neglected. This has been the tendency for quite a considerably time, consequently farmers would act in their own interest by keeping birds that will yield good feathers only.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes ...	19	0	0	31	0	0	Floss ...	0	7	6	1	10	0
First, ordinary to							Long Drabs ...	2	5	0	4	0	0
Seconds ...	11	0	0	14	0	0	Medium Drabs ...	0	15	0	1	10	0
Seconds ...	7	10	0	8	10	0	Short to Medium ...	0	5	0	0	15	0
Thirds ...	3	0	0	5	10	0	Floss ...	0	5	0	1	5	0
Femina Super ...	9	10	0	13	0	0	White Tails ...	1	2	6	2	5	0
Do., Seconds to							Coloured Tails ...	0	12	6	1	5	0
Firsts ...	4	10	0	10	10	0	Chicks ...	0	1	0	0	2	6
Byocks (Fancy) ...	4	0	0	8	0	0	Spadonas ...	0	10	0	1	10	0
Long Blacks ...	2	15	0	6	10	0	Inferior Black and						
Medium Blacks ...	1	10	0	3	0	0	Drabs, short to						
Short to Medium ...	0	10	0	1	5	0	long ...	0	0	6	1	7	6

Wool.—We now have the full reports of the Auction Sales, which recently have been held in London. Owing to a lighter competition, the London market has shown a rising tendency. At recent Sales at Cape Town, the following are the highest prices which were realised, viz.:—Malmesbury Lamb Wool, 7½d.; Malmesbury Summer Wool, 5½d.; Piquetberg Summer Wool, 6½d.; Piquetberg Lamb Wool, 7½d.; C. and C., 3½d.; Calvinia, 7½d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld ...	0	6½	0	6½	Wool for Washing ...	0	4½	0	7½
Do. Karoo ...	0	6	0	7½	Snow-white Super to Extra	1	4	1	9
Medium ...	0	5	0	6½	Do. Ordinary ...	1	2	1	5
Short and inferior ...	0	3	0	4½	Fleece Washed ...	0	0	0	10

Mohair.—There is no change for the better to be reported. In fact, the market remains stagnant, and for all medium and inferior qualities there is now again a demand for really fine hair, which farmers should be very anxious indeed to cultivate, thus furthering their own interest.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer ...	0	6	1	1	Winter ...	0	9	0	9½
Kids ...	1	3	1	8	Do. Kids ...	0	11	1	2
Seconds ...	0	5	0	9					

Hides and Skins.—It is a pleasure to me to be able to report a continued strong market. The demand and competition have proved further all that could be desired. However, it remains a great pity still to receive consignments with a large percentage of skins and hides with bad cuts insufficiently salted, or dried in the sun. These drawbacks should in future be avoided. Those who are handling skins and hides will find out that it pays best (a) to bestow the greatest care on the careful removal of skins and hides from the carcase, avoiding all and any bad cuts; (b) to have the salting done well; (c) to prevent drying in the sun.

	s.	d.	s.	d.		s.	d.	s.	d.
Long woolled Skins ...	0	5½	0	6½	Goat, heavy to light ...	0	10	1	2½
Short ...	0	4	0	4½	Sundried ...	0	0	0	6
Shorn ...	0	0	0	3½	Angoras ...	0	4	0	6½
Bastards ...	0	3½	0	4	Salted Whites ...	0	5½	0	7
Cape Skins, each ...	1	9	2	6	Sundried Hides ...	0	6½	0	7½
Do., cut, each ...	0	0	1	0	Wet ...	0	3½	0	4½

PORT ELIZABETH.

Messrs. J. Daverin & Co. report under date March 25: —

Ostrich Feathers.—The market was freely supplied this week with a good average assortment. Competition was active, prices generally ruling very firm; and in the case of average and common whites and feminas, decidedly higher.

Stocks are moderate, but new arrivals are coming in more freely. The next London sales open on the 11th proximo, when it is expected that prices will be maintained.

PRIMES :	£	s.	d.	£	s.	d.	TAILS (continued) :	£	s.	d.	£	s.	d.		
Extra Super ...	35	0	0	to 52	16	0	Female, dark, good								
WHITES :							average ...	0	6	6	to 0	12	6		
Good to Super ...	12	10	0	„	30	0	„ dark, short								
Good Broken ...	8	10	0	„	15	0	and narrow...	0	0	6	„	0	2	6	
Narrow ...	5	0	0	„	7	10	0	BLACKS :							
Thirds ...	2	0	0	„	5	0	0	Long (special) ...	7	0	0	„	12	10	0
FEMINAS :							„ good ...	5	5	0	„	6	10	0	
Super ...	15	0	0	„	25	0	0	„ fair ...	3	15	0	„	4	10	0
Good to Super ...	8	10	0	„	14	0	0	„ drabby ...	2	0	0	„	3	10	0
Good Broken ...	5	10	0	„	12	10	0	Medium ...	1	5	0	„	3	15	0
Fair Average ...	4	5	0	„	6	10	0	Short ...	0	12	6	„	1	2	6
Narrow ...	1	10	0	„	5	10	0	Wiry ...	0	0	6	„	0	2	6
Thirds ...	1	5	0	„	2	10	0	Floss, long ...	0	12	6	„	1	2	6
Greys ...	3	5	0	„	10	0	0	„ short ...	0	5	0	„	0	9	0
FANCIES :							0	DRABS :							
Super ...	9	0	0	„	12	10	0	Long (special) ...	4	10	0	„	7	0	0
Good ...	6	15	0	„	8	10	0	„ good ...	2	15	0	„	3	15	0
Poor and Narrow ...	3	10	0	„	5	10	0	„ fair ...	1	5	0	„	1	15	0
TAILS :							0	Medium ...	0	12	6	„	1	10	0
Male, good big bold	2	5	0	„	3	10	0	Short ...	0	2	6	„	0	9	0
„ good average	1	0	0	„	1	15	0	Wiry ...	0	0	3	„	0	1	0
„ Short & Narrow	0	7	6	„	0	15	0	Floss, long ...	0	12	6	„	1	2	6
Female, light, good,							0	„ short ...	0	5	0	„	0	7	6
big, bold ...	2	0	0	„	3	10	0	SPADONAS :							
„ light, good							0	Light (special) ...	5	0	0	„	7	0	0
average ...	1	0	0	„	1	15	0	„ fair to good...	1	5	0	„	4	5	0
„ light, short							0	„ narrow ...	0	7	6	„	0	17	6
and narrow...	0	3	6	„	0	10	0	Dark ...	0	10	0	„	3	0	0
„ dark, good,							0	CHICKS ...	0	0	3	„	0	7	6
big, bold ...	0	15	0	„	1	10	0								

The following may be quoted as the approximate current values of unsorted parcels, per line:—

				Whites.				Feminas.												
Superior pluckings ...	...	...	...	£10	0	0	to	£15	0	0	£7	10	0	to	£10	0	0			
Good Average lots ...	...	...	...	7	10	0	to	9	10	0	5	5	0	to	6	15	0			
Poor Average lots ...	...	...	...	4	10	0	to	6	5	0	2	0	0	to	4	5	0			
Common lots, stalky, narrow and discoloured ...	...	...	...	2	0	0	to	4	0	0	0	15	0	to	1	15	0			
Tails.				Blacks.				Drabs.				Spadonas.								
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.		
Good ...	11	0	to	16	0	20	0	to	50	0	12	6	to	17	6	30	0	to	40	0
Average ...	7	6	to	10	0	12	6	to	17	6	8	6	to	11	6	12	6	to	22	6
Poor ...	3	6	to	6	6	7	6	to	10	0	5	0	to	7	6	2	6	to	10	0

It will be understood that for Special Lots these quotations may be exceeded.

Wool.—The London Sales are progressing with a firm tone. Our market continues firm for all light well-conditioned clips of Grease and Snow-whites. Heavy and faulty parcels are neglected. At the Catalogue Sale on Wednesday, 2,395 bales were submitted, of which 1,175 bales were sold, prices showing little or no change. On the Public Market this week the usual oddments were offered, and prices showed no change.

Snowwhite, Extra Superior ...	20½d to 21½d	Grease, Coarse and Coloured ...	1½d to 4d
Do. Superior ...	18d „ 19½d	Scoured do. do. ...	1½d „ 8½d
Do. Good to Superior...	17d „ 17½d	Basuto Grease, short ...	6½d „ 6½d
Do. Inferior Faulty ...	14d „ 15d	O.R.C. Grassveld Grease, long	
Grease, Super Long, well-con-		& well-conditioned	
ditioned, Grassveld		(special clips) 7½d „ 8d	
grown (special clips) ...	8½d „ 10d	Do. do. do. ...	6½d „ 7d
Do. do. do. ...	7½d „ 8½d	Do. do. medium grown,	
Do. do. Karoo grown		light, with little	
(special clips) 7½d „ 8½d		fault ...	6d „ 6½d
Do. do. do. ...	6½d „ 7½d	Do. do. short, faulty & wasty	4½d „ 5½d
Do. do. Mixed Veldt...	7d „ 7½d	Do. do. Karoo grown, long &	
Do. Light, faultless, medium		well-conditioned ...	6½d „ 7½d
Grassveldt grown ...	6½d „ 7½d	Do. do. medium grown, light	
Do. do. Karoo grown 6½d „ 7½d		with little fault ...	6d „ 6½d
Do. do. short, do. 6d „ 6½d		Do. do. short, faulty and	
		wasty... ..	4½d „ 5½d

Mohair.—This market remains in a very quiet state, and no business of importance has been done in the open market during the week. On the Public Market on Tuesday a fair quantity was offered, chiefly consisting of mixed parcels, prices showing no change. We quote the following for:—

Super Kids ...	None offering	Mixed O.R.C. very mixed ...	7d to 8d
Ordinary Kids and Stained ...	do.	Seconds and Grey ...	5d „ 7½d
Superior Firsts, special clips ...	12½d to 12½d	Thirds ...	4½d „ 4½d
Ordinary Firsts...	11½d „ 12d	Winter Kids, special clips,	
Short Firsts and Stained ...	10d „ 10½d	nominal ...	16d „ 16½d
Superfine Long Blue O.R.C.		Do. good ordinary ...	14d „ 15d
Hair ...	10½d „ 13d	Winter Hair ...	9½d „ 10d
Mixed O.R.C. Hair (average) 8½d to 10½d		Basuto Hair ...	8½d „ 10d

Skins.—Sheepskins in bundles sold this week at 5½d., and Pelts at 4½d. per lb.; Cape, 23d.; damaged, 6d. each; Goatskins, 13½d.; damaged, 7d. per lb.; and Heavy Goatskins, 8½d.; Angoras, 7½d.; Shorn, 5½d.; damaged, 3½d. per lb.; Johannesburg Sheep, 5½d.; Goat, 9d.; Angoras, 6½d.; Springbok, 8½d. each.

Hides.—Sundried, 9½d.; damaged, 8½d.; Salted, 8½d.; damaged, 7½d.; Thirds, 3½d.

Horns.—3½d. each all round.

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SHEEP.—Woolled Persian Thoroughbred Cross-bred Rams (Merino and Hair Persian) from above. Price £3 and £2 each. Large carcasses, good wool growers, early maturing, hardy and vigorous, excellent mutton.—A. J. C. PARRY, Sheldon.

GENERAL.

PASPALUM GRASS PLANTS.—Strong roots per Rail or smaller plants per Post to any address. See larger advertisement, page ix, this Journal.—A. C. BULLER, Dwarsriviers Hoek, Stellenbosch.

DONKEYS.—Bred from selected Imported Mares and Catalonian Jack (imported), several young stallions 2 to 3 years old, black and Vinal coloured for sale. Apply to G. D. SMITH, Middlekop, Vryburg.

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The most valuable grass in cultivation for hay and green fodder supply. Quickest growing Heaviest yielder. Never surpassed by any other variety of Rye Grass. No Catalogue complete without my **Westernwolths Rye Grass Seed**.

Write me for Sample for your experimental ground.

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THE Agricultural Journal

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CONTENTS.

PAGE

NOTES	508
Mr. Sieberhagen's Champion Rams To Correspondents - French Rambouillet Merinos - Elsenberg Scores - Lucerne Seed and Tylenchus or Eelworm - Pumping by Suction Gas (<i>Illustrated</i>) - Enterprise at Sutherland - Fraserburg Notes - Implement Trials at Middelburg, 1911 - The New Albany Show Yard - A Remarkable Exhibit (<i>Illustrated</i>) - Ostriches on Lucerne - Chinkerinchee Poisoning (<i>Ornithogalum thyrsoides</i>) - Bee-keeping Demonstration (<i>Illustrated</i>) - The Duration of Scab Infection - Raisins and Dried Fruit Show - Live stock Insurance.	
THE TURKISH TOBACCO INDUSTRY IN CAPE COLONY (<i>Illustrated</i>)	516
IRRIGATION DEVELOPMENT IN SOUTH AFRICA WITH STATE AID	530
A FURTHER NOTE ON THE DRUG TREATMENT OF BILIARY FEVER OR MALIGNANT JAUNDICE OF THE DOG (CANINE PIROPLASMOSIS)	541
ACTUAL RESULTS OF IRRIGATION, EVAPORATION AND DRY LAND EXPERIMENTS IN CAPE COLONY	547
HEART WATER IN SHEEP AND GOATS	554
RETURN OF OUTBREAKS OF CONTAGIOUS DISEASES	560
AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS (<i>continued</i>)—(<i>Illustrated</i>)	561
IMPROVING MERINO FLOCKS BY SELECTION	578
CO-OPERATIVE EXPERIMENTS—CEREALS	583
EAST COAST FEVER	600
FRUIT EXPORT FOR MARCH, 1910	606
CORRESPONDENCE	607
Jackal Poison—The Plague of Small Birds - Pumping Tests on Boreholes - Fishes and Dams—Farmers' Stock Books.	
NOTES ON THE WEATHER OF MARCH, 1910	611
RAINFALL	616
PRODUCE MARKETS	621
MILK RECORD	625

NOTES.

Mr. Sieberhagen's Champion Rams.

We very much regret that, owing to an oversight in the last issue, the two Rosebank champion merino rams were credited to Mr. J. H. Sieberhagen. They are the property of Mr. J. G. Sieberhagen, of Vlakkfontein, Richmond, to whom all the credit of the championships is due.

To Correspondents.

"Enquirer," Box 53, King William's Town, has failed to forward his name with the letter sent in for publication.

French Rambouillet Merinos.

Professor Mansvelt, formerly of the South African College, writes stating that a Mr. Thironin-Soieau, of Cherville (par Beville-le-Comte, Eure St. Loir, France), who is retiring from farming, has an exceptionally fine flock of about 450 Rambouillet Merinos, which he is desirous of selling at the rate of about £10 per head if the whole flock be taken. He is prepared to sell singly or in small lots at reasonable prices. The rams are priced from £20 to £80 each. The flock includes both wrinkled and plain-bodied sheep.

Elsenburg Scores.

It is gratifying to be able to place on record the fact that at the recent Witwatersrand Agricultural Show, the Elsenburg Agricultural College came well to the fore. In the open Butter-making Competition there were seventeen competitors, four of these being Elsenburg students. Of these four one secured first place, another came second, and the other two were placed fourth and seventh respectively.

Lucerne Seed and Tylenchus, or Eelworm.

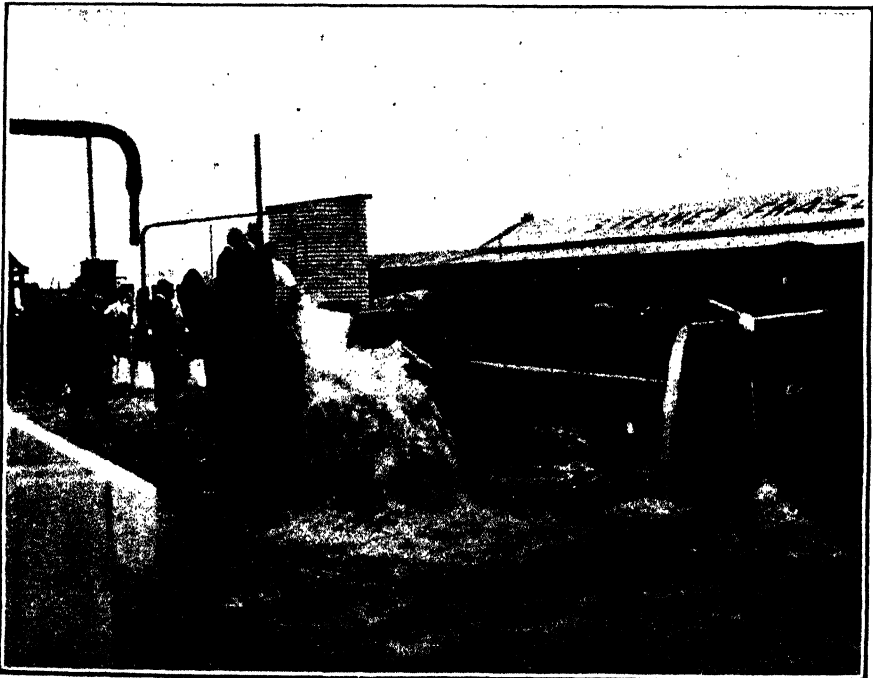
A prominent English firm interested in the seed trade, writes stating that as regards many hundreds of tons of lucerne seed which they have sold they never heard of a single instance in which *Tylenchus Devastatrix* has been discovered in their seed, and that they attribute this fact not only to their seed being grown in healthy districts, but to their use of a triple process of cleaning, which would certainly eliminate *Tylenchus* were it through any unforeseen circumstance present. They strongly urge that no seed, however free from *Tylenchus*, should be sown on infected land,

and in this view they have the support of the most eminent analytical botanists of the day.

Another large firm states:—"We have never found a trace of *Tylenchus Devastatrix* in any of the lucerne seed that we have sent out; we are confident that none could be in our seed after it has been cleaned by us. We consider Provence Lucerne the best kind to sow, and we always supply this variety unless otherwise specially ordered." The evidence is growing in favour of thorough cleansing of seed in order to avoid this pest, and it would be as well if South African growers gave more attention to this point. The slight extra cost is more than counter-balanced by the advantages.

Pumping by Suction Gas.

In the really fine exhibit of implements and machinery at the last Port Elizabeth Show one that attracted particular attention was that shown in the illustration herewith. This was a 34 b-p-p. up-to-date Ruston-Proctor suction gas engine with producer plant complete, lifting water by a centrifugal pump at the rate of 1,800 gallons a minute. So far as we



can gather, this is the last word in these excellent pumping installations, and it is certainly most satisfying in its work. It is difficult to realise how easily this plant was set going and how smoothly it worked even with a load of this description. As is generally known, the fuel used is charcoal, a simple and cleanly thing to handle. Judging by the number of installations now in use in this country and the number under construction, this system would appear to be rapidly taking a foremost place among power-producers for farm work.

Enterprise at Sutherland.

A correspondent informs us that Mr. Carel van der Merwe, of Quagfontein, Sutherland, has recently gone to the expense of importing a stallion from Holland, the cost being about £400. Such enterprise is to be recommended, and we trust Mr. van der Merwe will reap his reward in the improvement of his stock which must react in time on the district.

Fraserburg Notes.

Mr. W. A. B. Rowan, C.C. and R.M., of Fraserburg, writes:—On the 20th March, 1910, I returned to my District after an absence of close on to four months, to find the farmers all smiles, and their stock in the pink of condition. Good rains have fallen at short intervals, and the veld is fine. Let me warn my farmers against over-stocking, and urge them to take every precaution against destruction and deterioration of their veld. Keep the sheep in the veld as much as possible. By driving them to and from the kraals much of the young plant growth is destroyed. Last year the farmer had two increases of stock, and this year will see the same result. Things are looking up—water-boring and dam-making are the order of the day. The new-comers on the Zak River (Messrs. J. W. Louw and F. S. Oosthuizen) are straining every nerve to improve their farms. Activity is their keynote, and courage and resource their outfit. The rams purchased from Messrs. Pringle Bros. last year are giving entire satisfaction. All of them have been shorn, yielding from 22 to 25 lbs. of wool each; some are expected to yield 30 lbs. of wool at the next shearing. This amply proves that the Fraserburg District is *par excellence* a sheep district, and well suited for merinos. The ostrich fever has caught on, and many farmers are saving up money to buy birds of notable strain. This arid part of our Colony will soon be “the cynosure of neighbouring eyes,” made to blossom like the rose. It has a grand climate, and is favourable for man and beast.

Implement Trials at Middelburg, 1911.

The Secretary of the Middelburg Agricultural Society writes stating that his Society has decided to hold an exhibition of Fencing (including gates) and Fencing Appliances in connection with its next Show, and is offering a prize of £25 to the successful competitor. The Secretary will esteem it a great favour if makers, owners, and agents of fencing machines, gates, fencing material, tools, and appliances will at their earliest convenience send him illustrations and full particulars of these articles, so as to enable the responsible Committee to properly classify them. Immediately the classification has taken place full particulars of the competition will appear. The winning implements, etc., will be photographed and published along with the Judges' reports in this *Journal*. Every exhibit will be fully reported on. We trust the competition will meet with full support.

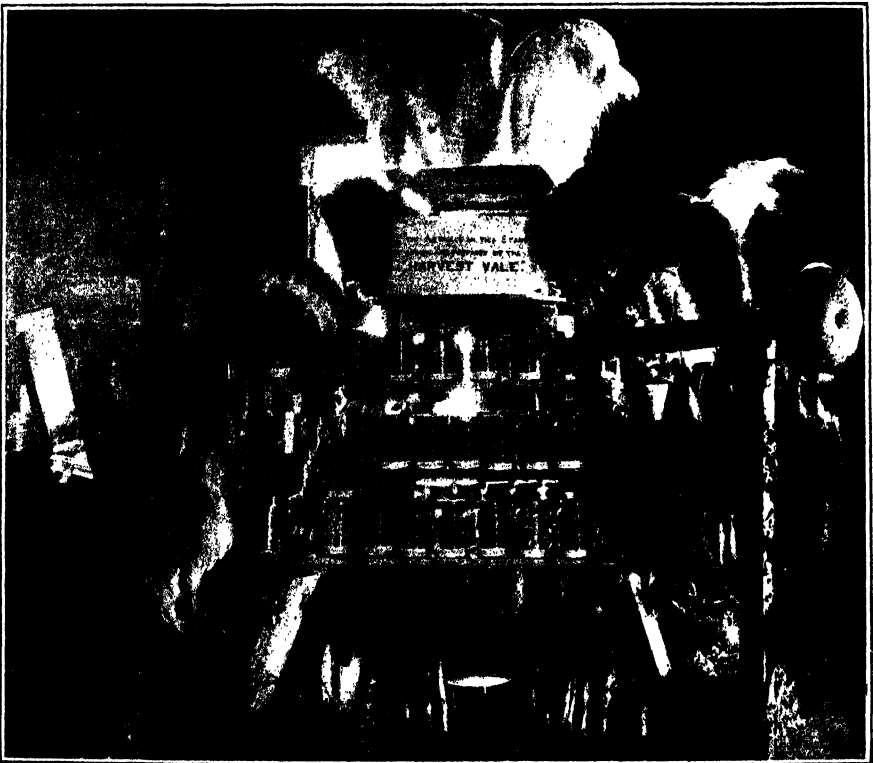
The New Albany Show Yard.

The Albany Agricultural Society is to be heartily congratulated upon its departure from the Grahamstown Market Square to a roomy and picturesque site on West Hill. Grahamstown is one of the prettiest towns in South Africa, and affords more attractive sites in its immediate vicinity than most towns of its size. It was, therefore, the more incumbent on

the Agricultural Society to add to its attractions that of beauty of position. The new site commands a magnificent view, is served by the railway running past the lower side, and is both comfortable and attractive. We shall look to Grahamstown in the future to provide one of the most popular agricultural shows of the country, and wish the Society all the success its enterprise deserves.

A Remarkable Exhibit.

Mr. Charles Gardner, of the farm "Harvest Vale," Salem, in the District of Albany, can claim the credit of the most remarkable agricultural exhibit of the whole of the last Colonial Show season. A portion of it is shown in the photograph reproduced herewith, but this does not convey a very clear idea of the whole. The exhibit was staged on a pyramidal stand, about six feet at the base and some seven feet high. On this was shown an extraordinary variety of products, all prepared and produced on the farm "Harvest Vale." The lowest tier consisted of samples of grasses



cereals, and fodder plants, extending to some thirty or so varieties. The other tiers were devoted to dairy products, fruits (fresh, dried, and canned), hams and bacon, dried beans, peas, etc., dressed poultry and game, and many household necessities, the whole being crowned with beautiful ostrich feathers. There was even an excellent painting as well. This exhibit was first shown at Grahamstown, where it was the "observed of all observers," and afterwards at Port Elizabeth, where it attracted the attention of the Prime Minister as showing what an African farm can produce.

Ostriches on Lucerne.

A correspondent signing himself "Nomad" raises a question of some importance in a recent letter. He asks for the best method of using small plots of irrigated lucerne for ostriches. Whether, for instance, having a couple of morgen of lucerne, it is better to run ostriches continually on it or camp them off on uncultivated ground and cut and carry the lucerne to them.

There can be little doubt that in order to make the most of a small paddock like this it is not advisable to run ostriches on it continuously. It is not good for the lucerne, neither is it good for the birds. The former is damaged by the tramping and becomes fouled by the droppings, while the latter consequently, in the course of time, become infested with internal parasites and pick up disease germs. To get the most feed off a morgen of lucerne it is undoubtedly better to camp the birds on uncultivated ground close by, and cut the lucerne and carry it to them. The success of this system depends to a large extent on the character of the country. Good Karroo veld yields plenty of feed in itself, especially if the camps are large and the natural bushes plentiful. The latter can be vastly improved by a careful system of rotation. This is accomplished by fencing off camps in addition to those in actual use, so that some can be rested to allow the natural vegetation to strengthen. A further improvement can be made by sowing "brak" or salt bushes in such paddocks. An experiment of great value to this country could be carried out on these lines, for such a system, on a large scale, is applicable to sheep and cattle farming as well as ostriches in the Karroo. Many of our most successful Karroo farmers are adopting this system with gratifying results.

Chinkerinchee Poisoning. (*Ornithogalum thyrsoides*.)

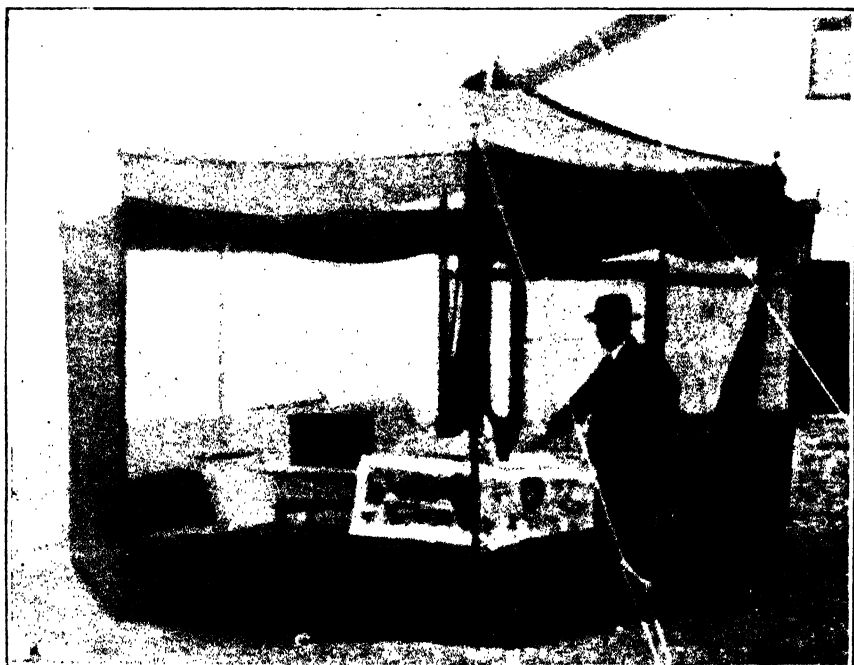
Readers of the *Agricultural Journal* will remember that in February, 1906 (Vol 28, No. 2) the late Mr. D. Hutchcon, then Director of Agriculture, published an exhaustive article on the "Poisoning of Horses by *Ornithogalum thyrsoides*, or Chinkerinchee." This article was based on feeding experiments carried out by the Veterinary Branch and outside investigations made by veterinary officers. The upshot of it all was that the apparently harmless Chinkerinchee (or Viooltje) was convicted as a highly dangerous poisonous plant, particularly for horses, and growers of forage were warned to see that it was not allowed to intrude itself into their oat-crops. Although the results obtained by the Veterinary Branch were quite sufficiently conclusive for ordinary purposes, there were some sceptics, but as no means were at hand to investigate the matter further it was left as it stood. Since that time, however, our farmers have been more careful to exclude this plant, and we have heard of no further fatalities.

Later on an opportunity presented itself for further investigation, and specimens of the plant were forwarded to the Imperial Institute, London, for chemical investigation. These were placed in the hands of Dr. F. B. Power and Mr. Harold Rogerson, who completed a most exhaustive analysis at the Wellcome Chemical Research Laboratories, with the result that the chemical investigation fully corroborates the conclusions arrived at by the Cape Veterinary Staff as to

its poisonous properties. The whole question was dealt with in a paper by Dr. Power and Mr. Rogerson, read before the Pharmaceutical Society of Great Britain, on March last. We cannot afford the space for this paper, interesting though it is, as we fear its numerous technicalities might prove confusing to the lay mind. Suffice it to say that the administration of five grammes of the ground air-dried material to guinea-pigs was attended with fatal results. No alkaloid was found, but a resinous substance was obtained, which seemed to chiefly contain the toxic principle, especially in that portion soluble in ether. As, however, report the investigators, all the extracts obtained by the successive treatment of the resin with various solvents were physiologically active, with the exception of the portion removed by light petroleum, there are apparently several poisonous substances present. The attempts to obtain a definite active principle from these various products were, however, unsuccessful.

Bee-keeping Demonstrations.

The growing interest in Bee-keeping which has been fostered by the recent attention drawn to that interesting industry by Mr. H. L. Attridge's series of articles in the *Journal*, is being maintained by lectures and demonstrations throughout the Colony. Among the lecturers Mr. Attridge has done most of the work. At the Port Elizabeth Agricul-



tural Show the Bee Tent (shown in the illustration herewith) was a constant source of attraction. Securely housed with his docile subjects, Mr. Attridge lectured and demonstrated day after day to large and deeply-interested audiences. The tent itself is constructed of fine gauze, allowing all outside to see what is going on inside, but preventing the bees inside from escaping. By this means the whole art and science of apiculture is demonstrated to the minutest detail.

The Duration of Scab Infection.

Mr. N. van Zyl, of Douglas, district of Herbert, writes:—"I feel it to be my duty to reply to Mr. A. G. Davison, Chief Inspector of Sheep, with regard to his opinion about the cleansing of sheep and farms. In his opinion, sheep, or farms, are not clean after a lapse of three months. Now, say, I have to 'trek' on account of drought, and my sheep are infected, then of course I have to dip them in order to have them clean for removal, but if three months are necessary for the cleansing of the sheep, they will all die of poverty and want. I am in favour of the eradication of scab, but not in favour of killing all the stock through drought, as would be the case with Mr. Davison contending that neither farms nor sheep are clean within three months.

An interesting point has been raised by our correspondent, which is worthy of the fullest consideration. But is he not labouring under a slight misunderstanding. The remarks of the Chief Inspector of Sheep which are criticised as as under:—"I maintain that no flock or farm should be declared as clean until at least three months have elapsed since the last signs of disease were noticed." These words, it has to be remembered are not applied specifically to existing conditions or to a possible "trek" in a bad drought, but in support of the Chief Inspector's plans for the complete control of the disease and possible eradication which he hopes to see attained under Union.

Mr. Davison's views as to the unsafety of presuming cleanliness under three months is fully borne out by observed facts. Experience has shown that where scab has existed among sheep, and the flock has apparently been cured and removed to another part, outbreaks have frequently occurred owing to the egg of the acari not having been destroyed by the dipping of the stock. Climatic and other conditions are doubtless responsible for such outbreaks, which in some cases have occurred several months after the flock has, to all appearance, been cured. The removal of sheep to the Transvaal, for instance, has proved this contention to be correct, for in the majority of instances in which scab has been discovered at the ports of entry on the border, the disease has been found on animals having old scab marks. The presumption is, therefore, that the heat and moisture occasioned by the close contact of the animals for several days in a crowded truck, has tended to the hatching of eggs which have been buried in the scurf or attached to clogged portions of the wool. For it has to be remembered that dipping does not act on the egg.

Raisins and Dried Fruit Show.

The Annual Dried Fruit and Raisin Show, under Government auspices, was held on the 22nd ult., in the Old Town House, Capetown. The quality of the exhibits was quite good, but the competition was far from keen. The following were the prize-winners:—**RAISINS.**—Two tons loose raisins: P. W. Marais, Wakkerstroom, Robertson, 2. One hundred 20 lb. boxes stalk raisins: P. L. le Roux, sen., Baden, Montagu, 1. Fifty 20 lb. boxes stalk raisins: A. B. le Roux, Baden, Montagu, 1; P. W. Marais, Robertson, 2. Twenty 20 lb. boxes stalk raisins: P. L. le Roux, jun., Baden, Montagu, 2. Fifty 5 lb. trays stalk raisins: S. W. Joubert, Boven Vallei, Wellington, 1. One ton Sultanas: C. Heatlie, P.O., De

Wet, 1; A. J. Marais, G.son; Willem Nels Rivier, Robertson, 3. Five hundred pounds Sultanas: J. A. Conradie, Klipdrift, Robertson, 1. Five tons Goudini raisins: D. S. Botha, Rawsonville, Goudini, 1. **DRIED FRUIT.**—Five tons prunes: R. D. Koch, Donkerhoek, Simondium. Half-ton figs: P. J. Cillie, G.son; Vruchtbaar, Wellington, 2. Half-ton pears: R. D. Koch, Simondium, 1. **MOST KONFYT.**—Fifty gallons most konfynt for domestic purposes: S. W. Joubert, Boven Vallei, Wellington, 1 (special). **MERCHANTS' CLASSES.**—One hundred 20 lb. boxes stalk raisins: Barry Bros., Montagu, second-class certificate. Two tons Sultanas: Barry Bros., Robertson, certificate. Five ton prunes: S.A. Dried Fruit Co., Ltd., Wellington, 1. Three tons apricots: S.A. Dried Fruit Co., Ltd., 1. One ton unpeeled peaches: S.A. Dried Fruit Co., Ltd., 1. Half-ton mebos: S.A. Dried Fruit Co., Ltd., 1. One ton pitted plums: S.A. Dried Fruit Co., Ltd., 1. One ton almonds: Barry Bros., Robertson, 1. One ton walnuts: Barry Bros., Robertson, 1.

Live-stock Insurance.

Stock men have often asked for Live-stock Insurance enterprise to be extended to South Africa. It has come among us at last, and in a form which is at least safe and assured. The Yorkshire Insurance Company, Ltd., a sound and old-established concern, which has been engaged in this kind of business for some time past, has opened a branch here. The local superintendent is Mr. W. W. Bird, his address 116, St. George's-street, Capetown, from whom all particulars can be obtained.

THE TURKISH TOBACCO INDUSTRY IN CAPE COLONY.

BOER TOBACCO.

The cultivation of tobacco has been carried on in the Colony for many years, but though the assistance of experts had been obtained from time to time, the industry did not advance as satisfactorily as was anticipated owing to a multiplicity of reasons. Reports on the subject were issued as far back as the early sixties, and throughout this period to the present date the Government has made efforts to foster the culture of a superior tobacco. During the period from 1889 to 1895, tobacco experts were employed by the Department of Agriculture to give advice to farmers, carry on research and encourage the development of the industry. Seeds of various varieties were imported from time to time which were offered for sale to the farmers at cost price, but the demand was not encouraging. "Boer" tobacco, as it is called, is grown throughout the Colony, and a quantity of about 5,000,000 pounds of leaf is produced annually, and is retailed at a relatively low figure. Only a small portion of the output is exported, the bulk being used locally.

TURKISH TOBACCO.—EARLY DAYS.

A certain amount of interest is attached to the early life of an industry, for most of its many vicissitudes are encountered in infancy. The Turkish tobacco industry has not yet emerged from its early or experimental stage, and it may still form a matter of conjecture whether the future is likely to see the Cape product being recognised as equal to the tobacco produced by other countries both in the quantity and quality grown, or whether its progress will be similar to that of the Boer tobacco, which did not fulfil the anticipations of those hopeful of an extended and flourishing industry. That the possibility of successfully cultivating Turkish tobacco in the Colony had been thought of by individuals is quite probable, but, strangely enough, it was an accident that led to the subject being seriously considered and which resulted in the first experiments being put down. In this respect the industry as it now stands is indissolubly connected with the name of Mr. L. M. Stella, the present Government Tobacco Expert, for it was on his representations that the Department recognised that the growing of another class of tobacco to that of the "Boer" tobacco presented many indications of ultimate success.

Mr. Stella commenced farming near French Hoek in 1903, and it was during this year that he received a letter from a friend in Turkey

containing a small quantity of tobacco seed of the Soulouk variety. The envelope with the seed was put away and, in the many duties falling to the share of the farmer, forgotten. When the envelope was first opened, however, a few seeds happened to fall in the garden in front of the homestead. These seeds germinated and, though very late in the season, Mr. Stella, who had seen a good deal of the industry in Turkey, was so taken up with the possibility of growing the tobacco commercially that he managed to obtain 40 plants from the seed accidentally sown, which were planted out and eventually grew up, and matured. This success, though small in itself, was the first fruits of the present expanding industry, for it became apparent to Mr. Stella, from experience gained in Turkey, that that country presented a great similarity in climate and soil conditions to those prevailing in certain portions of the Colony.



Turkish Tobacco grown at Stellenbosch, cured and baled, ready for use.

FIRST EXPERIMENT: 1905.

Being convinced of success, Mr. Stella was fortunate enough to secure a further quantity of seed from Turkey, and with this he laid down the first experiment with Turkish tobacco—as far as is known—in the Colony. There were many initial difficulties to contend with, but some of these were lightened by the experience gained in studying the results obtained from the plants which matured in 1904—5. These were planted without manure and in newly trenched soil, and though the growth was luxuriant the tobacco was deficient in flavour and burning quality. In 1905 two acres of sandy loam were ploughed, well drained and manured. A crop of nearly 1,000 lbs. was raised. This tobacco was sold at 1s. 0d. per pound, but it was afterwards seen that the product was worth from 2s. to 3s. per pound, and Mr. Stella was offered these amounts by a private firm for large quantities of this tobacco.

THE AGRICULTURAL DEPARTMENT AND THE INDUSTRY.—FIRST SUPERVISED EXPERIMENTS IN 1906

Following this success, Mr. Stella came in touch with the Department of Agriculture, and, as a result of the negotiations which followed, his services as an instructor were acquired by the Government, and the first supervised experiments were conducted under his guidance in 1906. These experiments were carried out at the Experiment Stations, and on nine farms situated in the French Hoek and Drakenstein Valleys, comprising in all an area of about $7\frac{1}{2}$ acres under tobacco. On this area about 12,000 plants were grown, but the return was much below what it should have been owing to the seed having been sown too late, want of experienced labour, disease, etc., but, notwithstanding, about 4,000 lbs. were put on the market. This result was encouraging, and was due in a great measure to the Government Expert, who performed his duty indefatigably and with patience in the face of unlooked-for difficulties. The farmers, though willing, were quite ignorant and had to be taught everything.

THE FIRST SALE, 1906 CROP (JUNE, 1907).

The question of a market for the crop obtained had next to be considered, and it was felt that much depended on the result of the prices received for the first crop of Turkish tobacco. Finally it was decided to sell the crop by auction, and accordingly arrangements were made for holding the sale at French Hoek. The general public and specially the six firms comprising, more or less, the number of wholesale merchants and buyers, were duly notified. The total weight of tobacco sold was 3,241 lbs., the prices ranging from 2d. per pound for waste leaves to 3s. 2½d. per pound for a fine sample, an average of 1s. 6d. per pound. When it is remembered that the tobacco sold was immature, the prices obtained are not as low as would appear at the first glance. Apart from the actual money received, the sale had the advantage of serving other purposes:—

- (1) By drawing public attention to the new industry;
- (2) By encouraging farmers to pursue the cultivation of the tobacco on a commercial scale;
- (3) By bringing growers and manufacturers into closer touch and demonstrating the different qualities required by the trade.

THE SECOND YEAR'S EXPERIMENTS, 1907—8.

This year, 1907, saw an increased area under cultivation, and the experiments were extended to nine districts, most of the last year's experimenters again participating. The combined plots equalled about ten acres in extent and, with two exceptions, carried out the promise of the previous year by again showing the suitability of the soil for the Turkish tobacco crop. A total weight of over 10,000 lbs. of leaf was produced. Two failures have to be recorded. These were the experiments laid down in the Riversdale and Mossel Bay districts. In both these places the tobacco at the outset grew luxuriantly, but when coming into maturity during the months of January and February, these localities were visited by heavy mists which damped the tobacco leaves and caused mildew. On this account the two experiments had to be abandoned.

It now became apparent that the area of land in the Colony on which the tobacco plant could be grown was not as extensive as at first anticipated, and it seems that the industry will be confined to certain districts in the Western Province of the Colony. The chances of successfully growing the plant in the East and Midlands appear at present remote, the conditions prevailing there pointing to failure, but as the industry has not had an opportunity of being conclusively tested in these parts there is still a probability of finding some suitable localities in the Eastern and Midland divisions of the Colony, where Turkish and American tobacco of a high quality can be grown on a scale to ensure commercial success. However, this does not detract from the value of the budding industry, for a wide scope of usefulness lies before it in the Western Province, and it has been submitted that it may prove in time a substitute for wine farming should this industry eventually become unremunerative.

THE SECOND TOBACCO SALE, 1907-8 CROP.

On the same lines as the previous year, the tobacco was placed on sale at French Hoek (July, 1907), and the public duly notified. Owing to the very few firms interested, the bidding was not considered brisk, and was confined to a few individuals. A quantity of 9,500 lbs. was sold, though not all at the sale, at prices ranging from 6d. to 4s. 9d. per lb., the latter figure being for a small parcel of 51 lbs., the next highest bid at which the tobacco passed hands being 2s. 8½d. per pound. The prices obtained averaged 1s. 11d. per pound, an advance of 5d. per pound on the previous year's prices. This substantial advance on an almost threefold increased quantity sold was quite satisfactory. The all-important lesson of the sale was that a good paying price can be obtained for the best quality leaf. It showed that growers unable to produce at under 9d. per pound were losers, and that unless a first-class quality product is offered it is impossible to expect a good price.

Before the sale, growers were optimistic and expected high prices for their produce, especially in view of the fact that owing to the import duty of 3s. per pound on the imported unmanufactured article anything purchased below this figure would be clear profit to the buyer. Their hopes, however, were not realised, and considerable dissatisfaction was expressed at the prices obtained, in several cases the return not covering the cost of production.

On the other hand, the manufacturers complained of the quality of the tobacco offered, which did not compare favourably with the imported article. This can be understood in the light of further experience, for most of the tobacco was immature and lacked some of the essential qualities. The manufacturers' complaint was not without reason, for the fault that in some cases the return did not cover the cost of production was not due to the supervised experimenters but to ambitious growers who offered the result of their own unaided efforts, a course of action which, combined with lack of previous experience and knowledge of the intricacies of the culture, is courting almost certain disaster.

The lessons were taken to heart, and it was seen that the permanent success of the industry could be assured only by the co-operation of producers and manufacturers, and that quality, not sentiment, must be the basis of such co-operation.

THIRD YEAR'S EXPERIMENTS, 1908-09.

Bearing the lessons of the previous sale in mind and with the knowledge gleaned from the preceding seasons, the industry was prosecuted with still greater energy and a much larger area than formerly was put under

cultivation. Fourteen additional farms were chosen for supervised experiments, and these together with several of the former experiments comprised an area of almost 70 acres under tobacco estimated to yield 35,000 lbs. Unfortunately, owing to severe drought and the appearance of cut-worms this yield was not obtained, and only 16,000 lbs. was realised. Much improvement was made this year in curing, and a better class of tobacco was consequently produced.

FIRST MANURIAL EXPERIMENT, 1908-9.

Hitherto all the crops, wherever possible, were raised with sheep manure, but the cost of transport of this somewhat bulky article is expensive, and if artificial manures of a more concentrated nature could be substituted without detriment to the crop a great saving in the cost of producing the article would be effected. The first manurial experiment was conducted this year (1908-09) at "Rust-en-Vrede," Simondium, and, of several combinations of the various fertilisers used, the application of the following gave the best result, viz.:—

Nitrate of Soda	...	...	...	...	200 lbs.	} per acre.
Superphosphate	...	...	...	...	224 lbs.	
Sulphate of Potash	...	...	...	...	160 lbs.	

THIRD TOBACCO SALE—JUNE, 1909.

Owing to its distance from Cape Town, it was thought that more competition would be forthcoming, with the resultant better prices, were the sale held in a more central place than French Hoek. Consequently, arrangements were made with the Cape Town Council by which the premises known as the Feather Market on the Dock Road, Cape Town, were procured. Participants were subject to the following conditions:—

- (a) All tobacco for sale to be forwarded to the Dock Road fourteen days before the date of the sale;
- (b) All railway and other charges in connection with the forwarding of the tobacco to be borne by consignor. Also all tobacco unsold to be returned to owner at his own risk and expense;
- (c) Each grower placing his tobacco on sale to pay the Auctioneer's commission charge of 2 per cent.;
- (d) The Government in no particular to be held liable for any loss incurred.

Mr. Stella, the Government Tobacco Expert, superintended the grading of the tobacco prior to the sale.

Again, the bidding was confined to two or three manufacturers, and the result, though a slight improvement on the last year's sale, was not particularly satisfactory. Of the 10,500 lbs. sent 3,000 lbs. were sold at the sale, and 7,500 lbs. at a later date out of hand at prices ranging from 1s. to 3s. per pound, averaging 2s. per pound. This shows an increase of 6d. per pound on the prices obtained at the first sale and 1d. per pound on the second and previous sale. It is satisfactory to note that with increased labour and the production of a better article higher prices were

realised each succeeding year. The tendency is not retrograde, and with the improved article will go the increased return.

It was again demonstrated that better prices would be realised—in some cases almost by 50 per cent.—if it were possible for producers to retain their crops for at least a year until they reached a more mature state. The manufacturer, naturally, is not prepared to offer a high price for an article which necessitates storage for a considerable period before use, and which entails the outlay of a large amount of capital that could be utilised for other purposes in the meantime.

FOURTH YEAR'S EXPERIMENTS, 1909-10.

The year 1909 saw marked progress in the industry, not only in the number of experimenters and the area under cultivation but also increased interest and its extension to other districts. There were originally 20 experimenters, of whom 12 were new aspirants, but of the latter two abandoned their experiments, reducing the number experimenting in 1909 to 18, extending over the Divisions of Stellenbosch, Paarl and Tulbagh. These comprised an area of 44 acres under Turkish and 9 acres under Virginian (American) tobacco. In addition to this, a private Syndicate at Banhoek, Stellenbosch, cultivated 50 acres of Turkish tobacco. There are also a number of former experimenters with about 10 acres under tobacco mostly the Turkish variety. This shows a total area under cultivation of 113 acres, and estimating that one acre yields 500 lbs. a total output of 56,500 lbs. of tobacco may be expected, provided the season is favourable. Thus the season 1909-10 is in advance of the three previous ones, and gives a clear indication of the future advancement of the industry. It is specially gratifying to see this progress when consideration is given to the difficulties contended with, such as pests, fungi, drought, lack of skilled labour, etc.

THE FIRST EXPERIMENT WITH VIRGINIAN TOBACCO.

It was pointed out that the efforts of growers should not be confined to the Turkish variety alone, as there is, in fact, a large local demand for the Virginian leaf, which is used to a great extent for purposes of blending. Consequently this year something like 9 acres were put under Virginian tobacco, and the American leaf promises as good a result, as far as can be judged this season, as the Turkish leaf. That this is a step in the right direction cannot be controverted, for though the small quantities of Cape Colonial grown Virginian tobacco do not equal in quality the products of other parts of South Africa, there is every reason to expect that with the experience of coming years the Cape product will equal, if not excel, as in the case of the Turkish variety, the best that can be produced in other parts of the country. The market oversea for Turkish tobacco presents two difficulties to the Cape grower, viz.:—

- (1) Distance from Europe;
- (2) Competition of tobacco countries with a very advanced industry.

These may be overcome in the future, but for the present the local market has to be studied, and this opens a wider scope for the American than the Turkish variety.

The Virginian leaf is estimated to produce twice as much per acre as the Turkish variety, but though this advantage is minimised by the fact that the latter product is double the value of the former, the advantage

still rests with the Virginian variety, for the cost of producing the leaf is proportionately reduced. Moreover, whereas the demand for Turkish tobacco is limited to one or two manufacturers, the number of buyers of the other variety is larger, and the keener the competition the more chance there is of obtaining higher prices.

SECOND YEAR'S MANURIAL EXPERIMENTS.

In continuation of the beginning made in the 1908-09 season, four experiments with fertilisers are being carried out this year, both on Turkish and Virginian tobacco, and have so far proved all that can be desired in the way of demonstrating that it is possible to successfully use a concentrated fertiliser in the place of the ordinary kraal manure.

FOURTH ANNUAL SALE, 1910.

It is anticipated that a departure will be made this year from the usual method pursued in disposing of the season's crop. In place of the usual auction sale it has been proposed that the tobacco should be sold by public tender in Cape Town, the advertising to be in the hands of the Cape Town Chamber of Commerce. Whatever is decided upon, however, ample notification will be given to all concerned.

COLONIAL-GROWN TURKISH TOBACCO AT THE IMPERIAL INSTITUTE.

Towards the close of the year 1909, samples of Colonial-grown Turkish tobacco were sent to London for exhibition at the Imperial Institute. One of the samples was submitted to two firms of English manufacturers for the purpose of obtaining their opinion as to the quality and value of the tobacco, and their report cannot be considered as anything but most satisfactory and hopeful.

The tobacco in question was grown in the Paarl Division, and consisted of one small bale of leaves, fairly uniform in size, averaging 3 to 3½ by 1½ inches, and of fine bright Turkish type. The leaves were in good condition, and had a pleasant aroma. The tobacco held fire well, but left a rather dark ash, the aroma of the smoke being good.

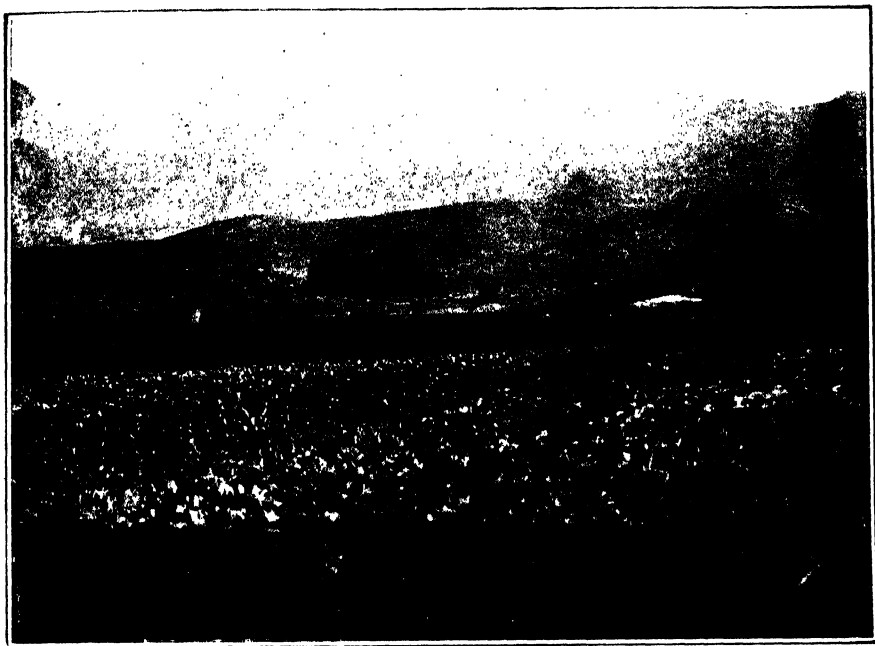
The following are the results of the examination of the Cape-grown article compared with a sample of Bashi Bagli tobacco examined at the Imperial Institute, viz.:—

Cape Sample. Bashi Bagli.

Moisture, per cent.	13.05	10.96
Nicotine, per cent.	1.15	1.88
Total nitrogen, per cent.	2.04	2.00
Ash, per cent.	7.24	11.46

The Ash contains:—

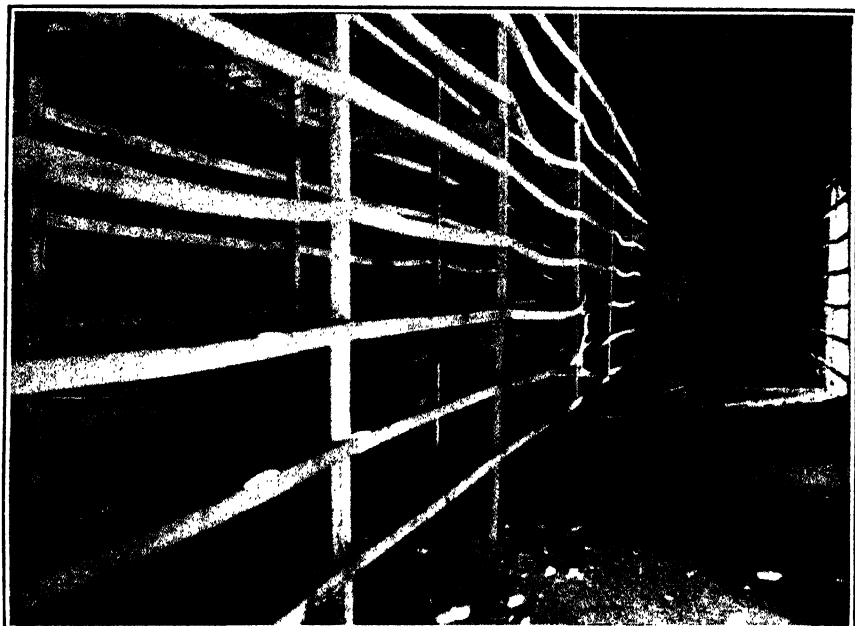
Lime	Ca.O.	per cent.	16.90
Magnesia	Mg.O.		16.08
Potash	K ₂ O.		10.28
Soda	Na ₂ O.		0.72
Sulphuric Acid	S.O. ₃		2.03
Chlorine	Cl.		trace.



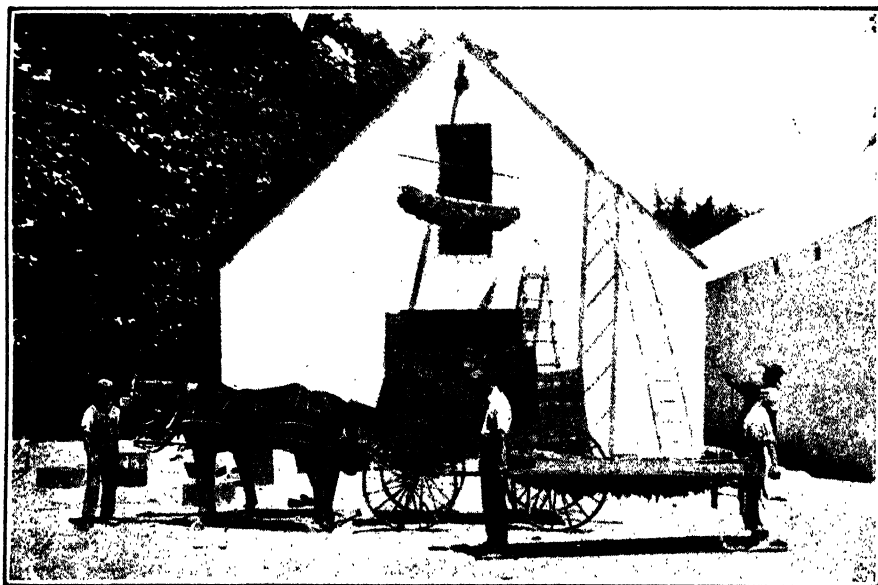
1.—50 acre field of Turkish Tobacco at Mr. W. H. van Breda's farm, "Seven Rivers," Banghoek, Stellenbosch. The tobacco extends from the foreground to the clump of trees in the distance.



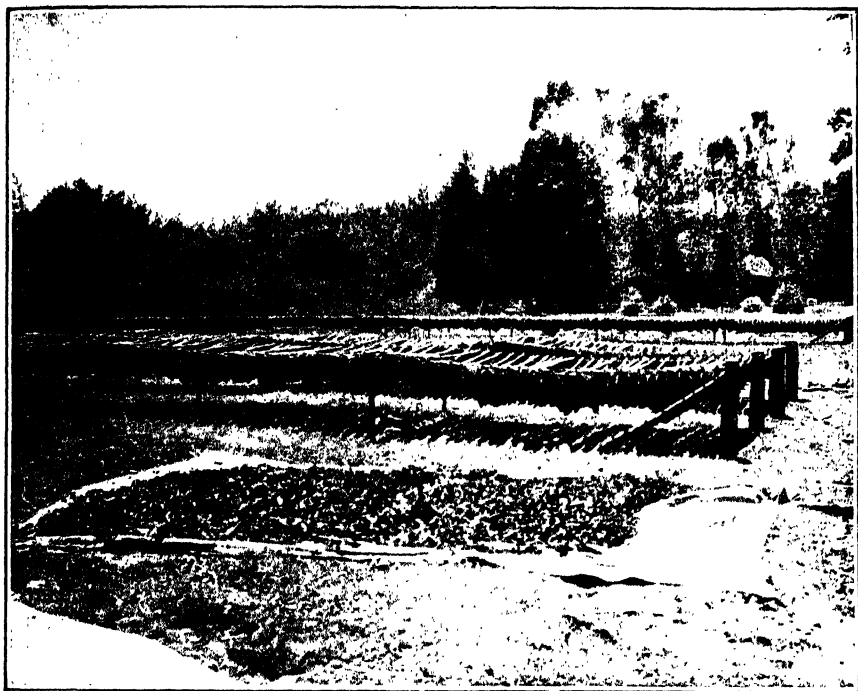
2.—Threading Turkish Tobacco leaves at "Seven Rivers," Banghoek.



3.—Looking into the Curing Shed or Wilting Room where the tobacco leaves are hung on rods after being threaded.



4.—In this three stages are represented. (1) Boxes of leaves fresh picked carted from the fields ; (2) completed rods of leaves being conveyed from the threading room to the curing shed ; and (3) rods of cured leaves being hoisted to the loft where they are stacked prior to pressing and baling.



5.—View of Curing Camp. This shows the second stage of the curing process.



6.—Cigarette makers busy at work at "Seven Rivers." Bales of cured Turkish Tobacco in the background.



7.—Field of Virginian Tobacco at Mr. P. J. Fisher's farm, Bottelary, Kuils River, treated with artificial fertilizers.



8.—Manural Experiment at Neethlingshof (Messrs. Louw Bros.) These plots were treated with artificial fertilizers on the left and kraal manure on the right. The former did just as well as the latter and the cost of manure was less.

From a commercial point of view the tobacco is considered of satisfactory composition. The amount of potash in the ash is rather low, but owing to the small quantities of deleterious constituents present it is sufficient to enable the tobacco to burn well.

Of the two firms to whom the sample was submitted, one reported that the tobacco was well sorted and packed, but was lacking in colour for this growth. They considered it a very good effort in copying the Turkish product, but thought the aroma needed improvement. They added that it would probably fetch a better price in Cape Colony than in the United Kingdom.

The second firm expressed the opinion that the tobacco would sell better if it were matured for some time and then graded according to size and colour of leaf and repacked. They considered that in this case the commercial value would be good. Without an examination of further bales the firm could not fix an exact price for the tobacco, but they stated that the present sample was not worth more than 1s. per pound, whilst the finest leaf, if graded, would probably realise 2s. per pound and the other leaves proportionately lower prices.*

Bearing in mind the high import duty on tobacco, this valuation is very satisfactory, and would pay growers handsomely. The report points more than ever to the importance of grading and maturing. The former process requires expert skill and in other countries is a highly specialised industry, being relegated to experts in the warehouses and not done by the grower.

There is evidently a great deal of pioneer work to be done in this country before the Cape product can be expected to successfully compete with the foreign article, but there is every reason to expect that honest, intelligent labour and diligence will eventually place the Colonial-grown tobacco in a position to emulate the products of other countries, with every chance of success.

The above is a short and rapid review of the growth of the Turkish tobacco industry from its humble origin in 1903 to the present promising position it occupies. Space does not permit a recital of the many vicissitudes passed through in the short history of the industry and which, undoubtedly, have still to be met. The success which has thus far met the efforts of the grower is due in no small measure to the conscientious and able work performed by the Government Expert, Mr. Stella, who has carried out his duties in a whole-hearted and practical manner.

To enable those unacquainted with the subject to take an intelligent interest in the new industry, a few succinct facts are given which will give some idea of what the work involves and what the advantages to be derived.

IMPORTS AND EXPORTS.

The following tables have been compiled for the purpose of showing the large quantities of tobacco imported into the Colony, and the net amount consumed:—

* Although not so stated these quotations are evidently meant to apply to the article in Bond.

TOBACCO IMPORTED INTO CAPE COLONY.

Year.	Unmanufactured.			Cigars.			Cigarettes.			Manufactured N.O.D.		
	Oversea.		From other States in Union.	Oversea.		From other States in Union.	Oversea.		From other States in Union.	Oversea.		From other States in Union.
	Quantity. lbs.	Value. £		Quantity. lbs.	Value. £		Quantity. lbs.	Value. £		Quantity. lbs.	Value. £	
1905	792,604	42,981	675,368	132,032	55,753	15,571	548,350	127,789	53,870	350,344	58,817	487,436
1906	1,148,505	42,935	725,887	128,400	39,929	19,900	183,712	41,257	21,004	394,871	10,312	1,305,726
1907	879,558	36,455	943,503	103,844	34,320	25,530	61,288	19,141	17,165	44,251	3,573	1,060,020
1908	1,098,115	46,220	290,136	77,294	26,631	46,752	62,616	18,979	27,180	30,750	5,062	1,091,528
1909	1,088,359	46,365	431,601	68,677	28,056	59,054	68,845	20,630	16,811	25,354	2,465	1,075,277
Total 4 years 1908-'9	4,104,517	173,986	1,820,107	373,215	129,056	151,136	374,541	100,007	82,100	444,130	19,352	4,582,351
Average, yearly	1,041,129	43,499	455,027	93,304	32,264	37,784	93,635	25,002	20,540	111,035	4,838	1,133,083

NOTE.—Heading "From other States in Union" almost all S.A. Produce.

TOBACCO EXPORTED.

Year.	Unmanufactured.			Cigars.			Cigarettes.			Manufactured N.O.D.		
	Oversea.		To other Colonies.	Oversea.		To other Colonies.	Oversea.		To other Colonies.	Oversea.		To other Colonies.
	Quantity. lbs.	Value. £		Quantity. lbs.	Value. £		Quantity. lbs.	Value. £		Quantity. lbs.	Value. £	
1905	3,367	178	£18,718	116	24	£1,511	463	203	£34,041	21,956	1,550	£28,801
1906	5,383	298	16,794	11,775	2,548	48,582	18,998	3,272	lbs	228,897	4,297	954,653
1907	15,633	922	18,032	6,576	1,335	48,718	15,341	2,355	450,683	58,757	3,150	871,552
1908	15,861	463	20,208	7,391	1,402	48,414	16,411	2,502	490,504	112,827	4,588	804,552
1909	9,619	585	46,612	4,517	952	38,782	13,340	1,798	636,190	43,788	3,020	1,072,316
Total 4 years 1908-'9	50,266	2,266	149,646	30,359	6,037	184,498	64,028	9,927	1,910,506	442,289	15,055	3,645,473
Average, yearly	12,574	566	37,411	7,565	1,509	46,124	16,007	2,482	477,626	110,567	3,764	911,368

NOTE.—Heading "To other Colonies" almost all S.A. Produce.

Pooling all the figures, it will be seen that the net quantity of tobacco, irrespective of the quantity grown and consumed locally, consumed in the Colony on a yearly average is 1,366,300 lbs.

STORAGE OF TOBACCO.

That the condition in which the Colonial grown tobacco is put on the market considerably depreciates the value is unquestionable, and if the industry is to progress to such an extent as to command prices more on a level with those obtained for the imported article, arrangements must be made for the proper storage of our product. As has already been pointed out, the tobacco will not fetch a high price when sold in an immature and crude condition, and it is essential for the producer to keep his crop for at least one year before placing it on the market. If this can be left over for still another year, the increase in value will be proportionate.

Naturally it is not everyone who can forego the return for the first year, but it is a matter which should receive earnest consideration and which lends itself to co-operation amongst the several producers. It is not too much to expect the erection of a central warehouse, on the same lines as in other countries, where the leaf can be bought direct from the producer, manipulated by skilled hands and experts, classified, and stored for maturing purposes before manufacture. Such a warehouse would prove a boon to the small farmer, who would be able to obtain advances on his raw material, and enjoy eventually the benefits of the enhanced value of the matured tobacco.

TOBACCO SEEDS.

The following varieties of seed are, and have been sown, the first two named being widely used, viz.:—

Turkish: Salouk, Cavalla, Baladovisi, Malcadji, and Turkish Bafra.

Virginian: Hester, Gold Finder, White Oronoka, Little Oronoka, Raglan's Conqueror, and Flanagan.

The Turkish tobacco produced in the Colony is in advance of that grown by the other Colonies, but the Virginian variety does not yet reach the standard of the Rhodesian Virginian grown tobacco.

COST OF PRODUCTION.

The cost of producing the Turkish tobacco is subject to variations, and is dependent, as are so many other things, on the state of the labour market. On those farms where cheap labour is procurable the net profit is, of course, much greater, and if this feature of the work is not judiciously operated the profit may easily be reduced to small proportions, if not total loss. It must, however, be borne in mind that the cost of labour in a new industry is always higher than it would be, all things being equal, at the end of a few years' working, for the labourer soon becomes expert at this work, and is able to do twice as much after performing the same duties for some time. The process of threading leaves is one which must be run economically, and it has been found that women and children, besides being cheaper, do the work more deftly and quicker than the ordinary farm hand. The piece-work system is recommended in this respect.

The following estimate is given for the *first* year's production, and the cost would be lower the second and subsequent years (in some instances by almost 50 per cent.) as the labourer becomes expert, viz. :—

Cost per acre per annum.

Rent	£0 10 0
Two Ploughings	0 18 0
Hand-hoeing and cultivation	0 15 0
Manure	4 0 0
Planting and transplanting, picking, threading, and pressing	8 0 0
Priming and warming	0 17 0
Total	£15 0 0

Cost of Seed.—1 oz. of seed should produce from 25,000 to 30,000 strong plants, and an acre of land will accommodate about 20,000 plants easily, and taking the value of seed at 5s. per ounce, the cost of seed for planting out one acre of land would be about 3s. 4d.

Total cost per acre.

Production	£15 0 0
Seed	0 3 4
	£15 3 4

Yield per Acre.—An acre of land, it is estimated, will yield about 500 lbs. of tobacco when the season is good, and valuing this at 2s. per lb., would realise £50 for the crop.

Gain per Acre.

Thus the gain per acre would be:—

Receipts	£50 0 0
Expenditure	15 3 4
	£34 16 8

But even putting the output per acre as low as 300 lbs. per acre per annum at 2s. per lb., the profit would be £14 16s. 8d. per acre, which compares handsomely with the returns received from other crops. Certain growers of Turkish tobacco in the French Hoek district state that for £100 expended by them in the production of the tobacco they got a return of £211, and that they anticipate the reduction of future working expenses by 50 per cent. The tobacco in question was matured for twenty months, and the buyer states that it cannot be surpassed in quality.

THE WORK ENTAILED.

The production of Turkish tobacco involves careful and constant application and intelligent labour. The return is large, but the attention required is proportionately exacting, and each process has its own dangers and difficulties, and each is as important as the other in the successful production of a good quality of tobacco. The various steps have been carefully and fully explained by the Government Tobacco Expert in the

pamphlet, entitled "Turkish Tobacco Experiments in the Colony" (reprinted from the *Agricultural Journal* for April, 1909), and further valuable information will be found in his Annual Report for the year 1909.

For the information of those who have not seen the work carried out, the accompanying illustrations will show to a certain extent some of the many processes. Most of these photographs here reproduced were taken on the property of Mr. W. H. van Breda, Seven Rivers, Banhoek, Stellenbosch District.

THE INDUSTRY AT BANHOEK

Mr. Van Breda has under cultivation some 50 acres of Turkish tobacco, and a visit to his picturesque farm is a delightful experience. Surrounded by some of our finest South African scenery, the approach to the homestead is along a road winding round the hillside, on the slopes of which are planted the million tobacco plants, each one of which has been separately handled. It is a beautiful picture, and one not soon forgotten. Here the whole process, from the sowing of the seed to the packing of the cigarette, ready for market, is gone through, and the whole presents a scene of active and cheerful labour. The owner had soon recognised the possibility of making a commercial success of the Turkish tobacco culture, and has put a large portion of his property under the crop. Added to this, some surrounding growers have formed a company with him on a co-operative basis, as a result of which we now have the "Union" cigarette, grown and manufactured on the Banhoek Tobacco Fields. Mr. Van Breda is to be commended for his enterprise, and it is trusted that his venture will meet with the success it deserves.

GROWING A CIGARETTE.

At Banhoek the visitor will see the whole evolution of the cigarette, which is brought about by the following steps:—

- (1) Selection of the seed, distinguishing between the good and bad, and rejection of the latter;
- (2) Selection of the Seed Bed, paying due attention to soil and aspect;
- (3) Preparation of the Seed Bed, comprising careful and exact manuring, measurement of beds, protection for sprouting plants, etc.
- (4) Treatment in Seed Beds, careful watering, and minute attention to the young plants. These appear from ten to fifteen days after sowing, according to weather, and must be protected.

These four steps are the foundation of the industry, and the raising of strong, healthy plants is of the first importance. Correlatively the preparation of the land for the reception of the young plants raised is carried out, thus:—

- (5) Preparation of land, including three ploughings, making a fine deep tilth, harrowing, rolling, etc.;
- (6) Manuring of land with the fertiliser.

Now that the land is prepared, the young plants, which have been duly selected, on reaching a height of about 5 inches from the seed beds are transplanted, each one separately.

- (7) *Transplanting*.—Conveying from seed beds to land, planting in rows, great care being taken to replace diseased and immature plants from time to time during the early days so as to obtain a uniform crop, which plays a very important role in the curing.

- (8) *Priming*.—The plant is not left alone, and at this period is especially subject to certain pests which must be rigorously dealt with by poisoned baits, etc.
- (9) *Signs of Ripening and Gathering the Leaf*.—The plants are carefully watched for indications of ripening which occur about ten days or a fortnight after priming. Then commences the very important work of picking the leaves, which is an art in itself, for the picker must know exactly how and when to gather the leaf. If picked too green no proper colour can ever be attained; if overripe it loses all its substance, and the leaf has the appearance of paper, is in fact useless. This work is usually done by the ordinary farm hand, who has to be trained accordingly.
- (10) *Threading the Leaf*.—The leaves gathered are put carefully into boxes or baskets, which are conveyed to the threading room, where they are sorted according to size, etc., the damaged leaves being set aside, and strung on to strong string, which is fastened on to Spanish reeds each 8 feet long. These rods are ultimately labelled with the date of picking and grade of leaves, so as not to cause confusion with subsequent pickings.
- (11) *The Wilting Room, 1st Step in Curing*.—The rods with their burdens of leaves are next placed on frames in the curing shed or wilting room, where they slowly wither and turn to a pale yellow colour without mouldering or decaying. This step, like all the others, requires a special attention and treatment of its own. The process lasts from three to four days, according to weather and temperature of the shed.
- (12) *The Drying Camp, 2nd Step in Curing*.—The rods of withered leaves are now placed on a trellis in some open place and exposed to the sun, where they go through the drying process. Great care must be taken to prevent sudden or too rapid drying. The leaves are covered at night by bags or canvas sheets, and in the event of rain must be taken under cover again. This process takes from 12 to 15 days.
- (13) *On the Ground, 3rd Step in Curing*.—Next, the rods of leaves are taken from the trellis and placed on the ground to dry. Light sprayings like dew are sometimes necessary to procure the best colour. The same precautions must be taken here as above.
- (14) *Cured*.—The leaves are now dried and still on the rods. They are conveyed to the store-room early in the morning, where they are stacked,—tips inward, butts outward—and well covered with blankets or sacking, prior to baling. Even here the work does not cease, for the tobacco must be softened before pressing, if very dry.
- (15) *Baling and Pressing*.—This is done at any convenient time after the tobacco is cured, but preferably when the leaves are supple and elastic in the stalk. Correct baling and judicious spraying are important steps, and if not properly conducted all the previous efforts of the grower may be nullified. When the tobacco is in a fit condition each rod is shaken, so that any sand or impurities may fall out, examined carefully for any mouldy leaves which must, of course, be removed and destroyed, classified according to grade and colour, and the strings of tobacco are then cut from the supporting rods and divided into lengths corresponding to the size of the bale, and may be put into the stack in this way or flat packed. After pressing, the tobacco is sewn

up in strong Hessian, with the ends showing the butts of the leaves. These ends are laced together criss-cross like a widely laced boot, and the bale, which usually weighs about 80 lbs., is ready for market.

In this condition the leaf is stored, and improves much with age.

It is the practice in Turkey to turn these bales over occasionally in the same way as is done with ripening cheeses.

MANUFACTURING THE CIGARETTE.

The work is not yet finished at Banhoek, where the baled tobacco is manufactured into cigarettes. This entails the employment of skilled labour, for the tobacco must be cut, sorted, blended, made up into cigarettes and packed into tins which are sealed and labelled ready for market. Such is the history of the cigarette.

PESTS AND DISEASES.

In common with other crops in South Africa, tobacco is subject to its own particular pests and diseases, such as cut-worms, mildew, earth fleas, bud worms, etc. The potato moth (*Lita solanella*) also causes considerable damage to the lower leaves.

All these difficulties can, however, be overcome, and the grower who gives his energy and wholehearted labour to the raising of a first-class quality product will be amply rewarded by obtaining a handsome return for his labours and outlay, to say nothing of the satisfaction derived from honest work well done.

The signs for the future are very hopeful, and it is confidently anticipated that the culture of Turkish tobacco in the Cape Colony will hold a field of honourable and profitable enterprise for many agriculturists.—
G. W. K.

IRRIGATION DEVELOPMENT IN SOUTH AFRICA WITH STATE AID.

Paper read before the Second South African Irrigation Congress at Potchefstroom, May, 1910, by F. E. KANTHACK, A.M.Inst.C.E., Director of Irrigation of the Cape of Good Hope.

The Union of the South African Colonies will, in due course, necessitate a revision or consolidation of the policies now pursued by the various States for the development of Agriculture through the medium of Irrigation. At the present time the different Colonies are not on an equal footing in this respect; neither as regards irrigation law nor as regards the methods by means of which the Government assists in the development of irrigation.

The Cape Colony has been practising irrigation for a very long time, as time is measured in the history of South Africa, and has now to its credit a large store of experience in irrigation matters which is of immense value during this period of progress and enlightenment when the area under irrigation is extending at a rapidly increasing rate.

An enlightened policy, trained agriculturists, and irrigation engineers are very necessary to foster and finance the developing industry; to teach farmers scientific methods of agriculture, and to seek out the possibilities of the country and utilise them by the construction of irrigation works. But it makes all the difference in the work whether these agencies are working with a body of farmers who are accustomed to irrigation, or with a body of men to whom the handling of running water is an unknown art. There is no doubt that leading water and preparing lands for irrigation is an art; and one best acquired in early youth. It has been forcibly brought home to me on many occasions both in India and South Africa that, as in all agricultural operations, the most important factor in efficient irrigation is the man with the spade and the trained eye for country.

Start a new irrigation scheme with a number of men who have no experience whatever in irrigation methods, and often know as little about agriculture in any form, and it seems almost hopeless to obtain even moderately good results. A few experienced irrigating farmers scattered amongst the number will soon work a very great difference, as example exercises a very powerful influence, and a community so leavened becomes, I think, amenable to expert guidance and instruction. A man utterly ignorant of agriculture and therefore of irrigation is often the most difficult individual to teach. In the Cape Colony the average poor white, whose previous pursuits as a farmer were wholly pastoral, furnishes an example of such uncompromising material for irrigation development. I repeat, therefore, that the Cape Colony has now a valuable asset in its large body of farmers and farm labourers, who from childhood have been accustomed to irrigation and its methods and to the management of flowing water, even though the methods to which they are accustomed are often crude

and inefficient. These men, reared chiefly in Oudtshoorn and the South-Western Districts, have been spreading through the country, and are a most important factor in the successful extension of irrigation in other Districts.

I do not mean to imply that these men are what might be called scientific irrigating farmers. Irrigation in the past has, in Cape Colony, been the reverse of scientific; and it is only in recent years that farmers have realised that they have much to learn about irrigation. Still, they are experienced water leaders and land levellers, and as such are well fitted to assimilate ideas appertaining to better practice.

The ordinary individual ignorant of the practical side of farming seldom realises how much has to be learned before a man can become an experienced irrigator, and expects that the mere voting of large sums of money for irrigation works will immediately turn the desert into a prosperous agricultural colony. He forgets the painful process of education which the novice at irrigation farming must first go through. Where a country is pioneering in irrigation, as is the case over the greater part of South Africa, the main policy should be to educate the farmers through the medium of small schemes. It is comparatively easy to train a farmer to the best practice of irrigation on a small holding of an acre or two watered from a strictly limited source of supply, such as a small fountain or a borehole. Such a man learns very quickly how to make the most of his small opportunities. He learns the art of preparing his lands properly, *i.e.*, of levelling, making the seed bed, and the best and most economical method of distributing water. Put the same man on a big canal with a good supply of water, and it seems almost impossible for him to acquire this experience. It is also a fact I have many times noticed, in India especially, that an experienced irrigator who has come from a region where, say, well irrigation is practised, which has in the course of centuries been brought to a very high state of efficiency, and is settled on a big canal with much more land and liberal water supplies at his disposal, is very apt to degenerate and become careless in his methods, and consequently obtains relatively much poorer results. Therefore, I say again, where in a country like this education in the art of irrigation is so essential for successful development, the first aim should be to foster small individual efforts. I consider no area too small to be worthy of attention. The man who would seek the Government Irrigation Officer's assistance to irrigate a morgen of land or less is the very man to be helped willingly, and the greatest care and patience must be exercised to ensure that the small patch of lucerne or other crop which he intends to establish will be a success. It must be understood that

A COUNTRY WHICH IS GRADUALLY DEVELOPING IRRIGATION

passes through defined stages of infancy, youth, and maturity. The early irrigating farmers confine their efforts to the construction of small furrows for the irrigation of limited areas of flat portions of valley bottoms, or small and simple storage works for the collection of surface drainage. Irrigation is confined to cereals, orchards, and gardens, and practised by the most primitive methods.

Competition for water in a stream soon leads to agreements as to water rights and, unfortunately, to much litigation, resulting in rights being defined by law courts, and such orders of Court are in many cases a great obstacle to the full and efficient utilisation of water at a later date. The decisions are very rarely based upon scientific hydraulic principles, and deal only with the dispute under consideration at the time. They do not take into account future developments, which will be much pre-

judiced by those often rough and ready decisions. The effect of such competition for water is to lead to the construction of the first permanent works for the distribution of water and to greater care being taken over the alignment and construction of furrows and the preparation of lands.

The next stage is what has been termed the community effort, under which a number of farmers on the same watercourse combine to carry out a joint scheme. In this country joint schemes originated very largely by sub-division of farms. As in the Oudtshoorn Division, for example, where the early owners of the very large riparian farms each took out their own furrows for the irrigation of as much as possible of the alluvial lands without having to go very far up the river above their boundaries for an intake. In the course of time these farms became much subdivided, which led to the development of an elaborate system of distribution and control amongst the shareholders.

The true co-operative or community effort under which a scheme is carried out from the commencement by a number of men is of very recent origin, but is now accounting in the Cape Colony for all the best and most prosperous undertakings. As regards works, we are, however, still in the pioneering stage. Hitherto they have consisted of temporary structures of the roughest character. The furrows were roughly excavated and badly graded, and lands received the scantiest preparation. This state of things is now passing, and works and furrows are now being designed on more scientific lines, are more permanent in character, and the professional engineer is now responsible, more or less, for the planning of schemes and the design of the works, be they large or small. At the same time we are still only just emerging from the pioneer stage, and the class of work built will for many years to come still bear the brand of this period of development. That is, they are of the very cheapest design compatible with safety, and much is sacrificed to a very low capital cost. Risks are cheerfully taken and high cost of maintenance is not considered. As time goes on the character of our works will gradually improve, but in a country like South Africa, where conditions throw much of the development on to individual effort, the bringing of the water on to the land at the very lowest cost compatible with moderate efficiency is essential. The farmer has generally to lay out large sums of money in the preparation of his lands, and unless he can get a speedy and considerable return on his outlay he will soon find himself in financial straits. Luckily irrigation is a paying affair, and in a few years a farmer is in a much better position to pay closer attention to the efficiency and improvement of his work. We are a long way from

THE FINAL STAGE OF DEVELOPMENT,

as represented by India and by the most advanced portions of the United States, where large comprehensive works are carried out from the very beginning and to the smallest detail in accordance with the best practice known. It is incumbent on all engineers when advising farmers or designing large irrigation works in this country at the present time, to produce work of reasonable efficiency under ordinary conditions at the lowest capital cost. This requires boldness in treatment of design, but not recklessness. All refinement in design should be left out in the first instance. The headworks, in a river subject to floods, must, of course, be designed either as a truly permanent work, or as a wholly temporary structure but works along the Canals should not be of too permanent a character as such furrows are constantly being re-modelled. At this stage we must not think too much about an occasional failure of a small weir or other structure. Certain risks must be run or the initial cost of irrigation works would

very often prove prohibitive. It is much easier for an engineer to design solidly built structures on the lines of the best known models and according to approved theoretical standards and with large factors of safety. Such an engineer will feel certain that he has constructed a work which is not likely to fail during his own lifetime. Such works are, however, not generally suited to the immediate requirements of the country. A less permanent class of structure may be equally efficient and very much cheaper. Factors of safety may be needlessly great, having regard, for example, to the extreme rarity of phenomenally large floods.

When an engineer is trying to give the very cheapest possible scheme compatible with ordinary efficiency, the responsibility placed upon him is greater. He should be familiar with the best practice and use his judgment to modify it so as to bring it down to the level of our early stage of development. Where he sees he must take certain risks he should take them deliberately and stand by the consequences. In a country like this the Irrigation and Railway Engineers must take risks as viewed from the standpoint of high-class practice, but these should always be carefully considered risks and should never be reckless.

IRRIGATION WORKS ARE NEVER COMPLETE.

Even in countries like India where works are designed originally as permanent works complete in every detail, conditions are continually changing. Improved agricultural methods are discovered, economic conditions change which lead to different varieties of crops being grown which calls for new system of distribution, and so on. In consequence, re-modelling is continually in progress and a big Canal System which is not continually adapting itself to new conditions, can only belong to a decaying community.

This is much more the case in the earlier stages of development such as we are passing through, and is a strong reason against the construction of works of too permanent a character, more especially with regard to subsidiary works.

These preliminary remarks are necessary to the proper understanding of a discussion of the best methods of promoting Irrigation development by assistance from the State.

In popular opinion the function of a Government Irrigation Department is to construct, and subsequently to control, large irrigation works, and in the Cape Colony until comparatively recent times the energies of the Public Works Department, so far as they were concerned with irrigation, were confined entirely to such schemes. The record of this work is hardly encouraging. The main schemes actually carried out were those at Van Wyk's Vlei, Douglas, Brand Vlei and Rooiberg near Kenhardt. The latter work cost nearly £50,000, and failed before it had irrigated a single acre; and was, moreover, ill-considered in general. The other three are in working order, but have barely paid for the cost of ordinary maintenance, and have therefore been financial failures.

NUMEROUS LARGE AND COSTLY SCHEMES

have been worked up, and some of them came very nearly to being carried out, such as the Buchuberg project on the Orange River and the Thebus project in the Steynsburg District, both of which were abandoned after considerable sums of money had been spent.

Other big projects such, for example, as the proposed big reservoirs at Boysen's Poort, at Calitzdorp, and on the Grobbelaars River near Oudtshoorn, and the big Harts-Vaal Project, luckily for the taxpayer, did not get as far as being started. The records of the Public Works Department

are full of projects, many of them having been surveyed in considerable detail only to be shelved, some for no apparent reason, others for specific reasons, mainly financial. Now this is a very sorry record of State effort, and there must be some very good reason for failure in a line of development so vital to the progress of the arid portions of South Africa. Well, reasons there are many, and I will give a few of them. Taking first the older schemes such as Brand Vlei, Van Wyk's Vlei and Douglas, these, unlike most of the latter projects, were constructed for the irrigation of Crown land, and obviated the purchase at rates considerably above market value of large tracts of land, and these schemes should have started under advantageous financial conditions. At the time they were constructed and until within a few years, the sole object of irrigation works was the growing of cereals. In former times the price of wheat on the internal markets was very high, and it is still high, but, unfortunately, the cost of constructing irrigation works is also high in this country, and matters were further complicated by the high and sometimes ridiculous prices paid at auctions for the lots sold under these Government schemes.

Thus a man with no resources whatever found himself in possession of a small holding of irrigable land for which he had paid (or rather for which he owed) an exorbitant purchase price on which interest and redemption charges had to be met. His knowledge of irrigation farming was limited or non-existent, and he had further to pay a heavy water rate of 20s. per acre or more. Under which conditions the cultivation of cereals is out of the question. Some more enterprising men established orchards of indifferent trees which were often ruined by faulty methods, and even where good fruit was produced no market was obtainable. Leguminous crops, such as peas and beans, were occasionally tried, but it was generally found difficult to obtain a market for the produce.

Most other schemes, and especially the storage projects, all contemplated the purchase by private treaty of all the land required for the scheme, be it submerged land in the reservoir, or land to be irrigated. This generally had the effect of greatly inflating the capital cost, as such land bought by the Government is never obtained at its real value. Under a Government Irrigation Scheme the irrigable land must generally be sold in small holdings so as to benefit the greatest number, otherwise the risk would not be justified from a national point of view. For such small holdings to prove profitable under our conditions the cultivation of something better than cereals is necessary. Now, unfortunately, cereals are the only agricultural produce which have a certain market. But the margin of profit, even where a profit can be made, is too small to justify the growing of wheat, oats, barley, and maize on small irrigated lots. Only in the Zak River region in the districts of Calvinia, Fraserburg and Kenhardt, can such crops be profitably grown under irrigation, and that is due to the peculiar conditions in that locality which makes the basin system of irrigation possible. Northern India is, I think, the only country which can grow wheat under irrigation, and export it over sea at a profit, but Indian conditions in respect of the production of cheap irrigation produce are unique.

A SMALL STATE IRRIGATION SCHEME

will generally be split up into a large number of small holdings which, I think, should never be less than 10 morgen in extent of irrigable land with commonage rights attached. A large State scheme might embrace holdings of greater size, say 100 morgen as a maximum. With small lots the productions must be confined to fruit-growing, dairy farming, with lucerne, ostriches, tobacco, vegetables, etc. On larger schemes operations

may be more extended to include a moderate area under crops of less value than those given above, but in the main the same class of crops would have to be grown. Now at the present moment there is really only one crop which makes irrigation development on an extensive scale possible, and that is lucerne, this crop being the basis of ostrich farming, though it may be looked upon as the basis of stock-farming generally in the Cape Colony. And I hold that for a considerable time to come profitable irrigation must remain an adjunct to stock-farming. We have a number of closely settled irrigated tracts in the Cape Colony, more especially in the South-Western Districts, but the prosperity of these is almost entirely bound up with lucerne cultivation for ostriches, tobacco and viticulture. As soon as other lines are taken up the great difficulty of marketing the produce asserts itself. The difficulty of getting markets is the stumbling-block of all extensive projects which contemplate close settlement. Our internal markets are very bad, owing to the very small consuming power of the country, and the warm climate; while the difficulties and expense of long transport places severe and real obstacles in the way of export, and in many cases makes it impossible. For closely settled irrigating colonies to prosper, some great changes in our conditions and methods are essential. Operations must be confined to the production of high-grade crops only, or to crops such as sugar beets or fibres, which are capable of being manufactured into a readily marketable article by co-operative effort on the spot. Dairy produce and dried fruit should be dealt with locally by similar agency. Under these conditions alone are extensive irrigation colonies in South Africa possible until internal markets have vastly improved and transport facilities have been improved and cheapened. We have not at present a class of small farmer who can be settled in a colony of this kind. A State canal settlement will most certainly become a colony of poor whites whom it will take a generation to train to the standard required, and there is no getting away from the unpleasant fact that the Government itself is unable to reform this unfortunate section of our population; while if there are settlers of a better kind, I have found that for some time to come there is ample scope for such men's energies on the large farms now under development. Many parts of the Cape Colony which are now extending irrigation rapidly are beginning to feel the shortage of suitable white men. It has been found that one responsible white man is required for every 100 acres of lucerne lands as a maximum, and during the next few years all the better class of poor whites who have the requisite knowledge of irrigation farming, and the will to work, will be readily absorbed by these estates.

CLOSE SETTLEMENT COLONIES

are without doubt required, and will probably have to be established by the State for the purpose of reclaiming poor whites, but these settlements should be mere training grounds subject to strict discipline and carefully guarded from the politician, especially at election time, so that no promises of easement can be exacted from prospective members of Parliament; for it must be confessed that in the past political influences have done much to demoralise some of our Irrigation Settlements.

Where an Irrigation Settlement is composed wholly or largely of experienced agricultural farmers who understand the possibilities of irrigation and are ambitious to get on, it will, if properly engineered in the first instance, be certain to be remunerative, in spite of being a Government concern. Where, however, the settlers are not drawn from such ideal sources, it is essential that they shall have a large financial interest at stake in the concern, otherwise they will never attempt to develop their

resources, and will demand concession after concession from Government till the settlement is thoroughly pauperised and demoralised.

This unfortunate state of things will, I trust, disappear in course of time, but at present I consider that only under very special conditions should State undertakings be embarked upon, *i.e.*, schemes constructed and maintained by the State. As a general rule they should be State-aided Co-operative enterprises. This principle was incorporated in Act 8 of 1877, which provided for the creation of Irrigation Districts and Boards, and gave these Boards powers to levy rates and borrow money. The reasons why this particular Act was not productive of much co-operative development need not be gone into here. With but little alteration its provisions have been incorporated in the present Cape Irrigation Act, and have been the means of remarkable development during the past few years. Under the Cape system the projects are generally worked up by the Irrigation Department, which lays it before the farmers interested, and the work is then taken up by a group of enthusiastic farmers who proceed to canvass the district and to obtain the support of as many farmers affected by the scheme as possible. A petition for the formation of the district is then presented to the Minister by riparian owners representing not less than one-tenth of the gross area in the proposed district. A general inquiry is held by an engineer of the Irrigation Department, and after all evidence for and against has been heard, and it has been satisfactorily proved that owners representing two-thirds of the irrigable area are in favour of the scheme, the Governor may proclaim a clearly defined area as an irrigation district. In this case any objecting minority is forced into the district. Voters' lists are then prepared, and a Board elected in due course, and the whole area within the district has for irrigation purposes a constitution of its own with the Board as a little Parliament. This Board has the power to borrow money and to levy rates, and the Cape Irrigation Act permits the Government to grant loans to a Board taking as security the rates which the Board may levy. The works for which the money is borrowed must, as in the case of all loans, be constructed to the approved designs, specifications and estimates of the Director of Irrigation, who keeps general control over the works until the loan has been redeemed. Experience has enabled the Government to draw up suitable regulations under the Act for the establishment and control of Boards, audit rules and bye-laws for the Board's use. One of the chief causes of the rapid development of co-operative irrigation is the power of these Boards to get cheap money from the Government on the security of the irrigation rates; and whatever shortcomings there may be in this machinery, perfection being impossible, there can be no doubt that it suits the conditions of the country.

An exception to the principles above enumerated must, I think, be made in the case of large storage reservoirs or very large diversion dams and similar works in big rivers. Such works may well serve an ordinarily constituted irrigation district, but they should be constructed and maintained and controlled by the State, rates being levied to meet charges for interest, maintenance and redemption of capital.

THE POLICY FOR THE FUTURE.

I will now state briefly what I consider the best policy to be pursued by Government in South Africa for the development of Irrigation.

First and foremost, the Government should carry out a thorough and systematic hydrographic survey of the whole country, the object of which, broadly speaking, is to collect accurate data about all the known supplies of water in the country, be they running streams, or intermittent; the

run-off from different catchment areas; the location of underground sources of supply, possibilities for generating power and other similar matters. A hydrographic survey should be able to look to the department responsible for the collection of meteorological data for a large measure of assistance, but this is unfortunately not the case in South Africa.

Secondly, it is the duty of the State to aim at providing the most efficient system of water law, which, while respecting existing rights to the fullest extent possible, must be of a progressive and, if I may say so, of a Socialistic character. The laws of South Africa are based on those of the parent countries which are in no need of irrigation and water conservation. In a semi-arid country the water law must, so far as possible, aim at giving the greatest amount of benefit to the greatest number.

Irrigation law must provide the most efficient machinery for developing irrigation, while at the same time safeguarding established interests. Machinery is also required for administering the law with as little expense to the farmers as possible. The Cape Water Courts aim at this, but, while I consider the principle sound, there is little doubt that the composition of these Courts requires to be strengthened by the inclusion of special water magistrates, who should travel about the country and sit with the local Magistrate and one assessor.

Thirdly, following on the Hydrographic Survey, the State should carry out systematic reconnaissance surveys with the object of discovering where and how the available sources of water supply can be utilised to the best advantage for agricultural or power purposes. Such surveys should work systematically through the main and subsidiary drainage areas of the country, and should demonstrate the feasibility, not only of large schemes but also the small ones on individual farms. Projects should be surveyed to a sufficient extent to prove whether schemes are good and practicable or not, and if large comprehensive schemes are not possible for special reasons, alternative smaller schemes should be put forward.

The results of a reconnaissance survey should be intelligently put before the people interested, and where co-operative schemes are proposed every assistance should be given in forming Irrigation Districts. The projects which emerge from the reconnaissance survey should not be finished schemes with all details ready for immediate construction, but should be carried only sufficiently far to enable a fairly reliable project estimate to be prepared. Should the scheme be taken up by a Board or by an individual, the cost of subsequent detailed surveys and of the preparation of plans, etc., should be defrayed by the parties concerned.

Fourthly, in the early stages of development, the Irrigation Department must be a bureau for giving advice on all matters bearing on irrigation, and in this respect must work in close touch with the agricultural experts. Irrigation should in fact be under the same Ministerial Department as agriculture, as otherwise the free and informal co-operation of engineers and agriculturists is impossible. The officials in charge of irrigation must be able to travel freely about the country, and possessed with a sound practical knowledge of agricultural requirements, should be able to patiently explain to farmers how to carry out their schemes. They should look for new possibilities, and act generally as missionaries.

In addition to this, practical assistance should be given at a nominal charge for the surveying of small schemes, alignment of furrows, selection of sites for dams, and the working up of engineering details. This kind of assistance is of the utmost importance in the early stages of development, and it is of a kind which will be readily sought and acted on when supplied by the engineers of the department at a small fee, when the farmers have once gained confidence in the irrigation staff. This they readily do if the staff is competent, tactful, and enthusiastic. At the same time

such advice cannot be readily given at reasonable fees by engineers in private practice, and unfortunately there are men who try and practise amongst the farmers who are by no means competent to give advice.

Where assistance from the Government is sought to carry out extensive surveys, the fees charged should be such that competent engineers in private practice may compete for that class of work.

It is essential that farmers should be able to get advice or professional assistance promptly and without official formalities or "red tape," and the staff entrusted with advisory work must be very easily accessible and should be able to settle all formalities personally with the farmers direct. I have known farmers to prefer making mistakes through acting by themselves rather than start a correspondence with headquarters about obtaining the services of an engineer.

Fifthly, farmers and others desirous of carrying out irrigation schemes of an approved character should be able to obtain money on the easiest of terms from the Government, due regard being paid to security and efficiency of the works to be constructed. With regard to the security, the enhancement in the value of the land to be irrigated should be fully taken into account, be it as the enhanced valuation of land to be mortgaged, or by accepting irrigation rates leviable by an Irrigation Board as security. If this broad view be not taken, the owners of many of the farms in most need of improvement by means of irrigation will never be able to raise the necessary capital for the carrying out of the works. At the same time I do not favour the acceptance of anything but really first-class security, and in judging security the life of the loan must be considered. Thus I do not think the exaggerated land values now obtaining in Cape Colony should form the basis of a loan granted to-day which is to run for thirty years. The permanent and intrinsic value of a property must alone be considered.

Irrigation Loans can only be granted for the construction of works or the purchase of plant. It is, however, very necessary to supplement these loans by small agricultural loans for land development, etc., as it frequently happens that a man who has carried out a good irrigation scheme under a Government loan finds he cannot make proper use of the works owing to his inability to find the necessary capital for the development of his lands. Agricultural Banks are the best agents for meeting this difficulty, as I do not consider irrigation loans should go beyond the limits of irrigation works themselves, experience having shown that the control of expenditure by applicants becomes almost impossible.

Sixthly,—The Government should establish experimental stations or farms at a number of representative places where the most efficient methods of dealing with local conditions of climate, soils, topography and water supply can be properly experimented with and demonstrated. This should form part of an organised system of agricultural education and research. This branch of State activity I consider most necessary, as, in the first place, South Africa is to a large extent an arid and semi-arid country, and every effort must be made to make the very fullest use of our available sources of supply. And in the second place, bad methods of irrigation, be they the use of too much or too little water, or badly laid out lands which cause deterioration of the soil through the rapid leaching out of plant food, or alkali and other troubles due to want of drainage, are all the cause of severe troubles and may bring ruin to individuals, and even to districts.

Finally.—The State must look closely to the conservation of its sources of supply by protecting the natural vegetation over the main gathering grounds of the streams. All the higher elevations of the mountain ranges which are the sources of rivers and springs capable of being

utilised in tracts requiring irrigation should be under the most rigid protection. Afforestation is excellent where it can be profitably done, but in the Cape Colony most of the great ranges such as the Zwartbergen, Langebergen, and Cedarbergen are not suitable for afforestation. These mountains will, however, if protected from fire and lopping, maintain a heavy growth of bush and grass which is capable of retarding the run-off considerably, and maintaining the perennial flow of streams and springs.

The above mentioned lines of action indicate merely a skeleton of the policy which I consider is the best one to follow in South Africa for some years to come. In the Cape Colony it has in a large measure been followed in recent years to the extent possible during a severe financial depression, and the results of this policy have clearly shown its unquestionable merits.

In conclusion, I will briefly show to what extent the Cape policy has borne fruit during the past three years—years, be it remembered, of acute financial depression, during which the irrigation staff was cut down to a minimum compatible with its existence as a separate agency, and funds for surveys and loans were very scarce. The practical results of the activities of the Department for the three years 1907, 1908, and 1909 may be summarised as follows:—Area to be brought under irrigation within five years of the commencement of the respective schemes—almost exactly 100,000 acres involving an expenditure of £550,000. Allowing £1 per acre as the unimproved value of the land which is above the mark, and £25 per acre as the value of the land now brought under irrigation, which is, at present values, below the average, the enhancement in value of the land brought under irrigation amounts to £2,400,000, or, allowing for the cost of the works, to £1,850,000. Against this increase in value the sum spent on irrigation services during three years amount to only £45,000.

Altogether ten irrigation Districts have been proclaimed which have or are constructing works under Government Loans amounting in the aggregate to £116,000, and the combined ratable area is 30,000 acres.

Four more Districts are now in course of formation with a ratable area of approximately 20,000 acres, and involving a capital of £200,000. Some further particulars of the progress made with State-assisted irrigation is shown in the statement which is printed with this paper.

Over and above this must be added a very large area of new land brought under irrigation through private enterprise, with which the Department was not directly connected.

IRRIGATION STATISTICS.

STATEMENT SHEWING IRRIGATION DEVELOPMENT IN THE CAPE COLONY AS THE PRACTICAL RESULTS OF THE OPERATIONS OF THE IRRIGATION DEPARTMENT DURING THE THREE YEARS ENDING 31ST DECEMBER, 1909.

STORAGE WORKS.

Class.		Capacity acre feet	Estimated cost. £	New Land brought under irrigation.
Advisory ...	26	102,695	108,662	14,070
Loans ...	51	8,779	38,844	6,227
Total ...	77	111,474	£147,506	20,297

CANALS.

Class.		Estimated cost. £	New Land brought under irrigation.
Advisory	68	63,624	27,252
Loans	29	233,674	42,970
Total	97	£317,298	70,222

PUMPING SCHEMES.

Class.		Capacity gal. per minute.	Cost. £	Land irrigated.	TYPE.			
					Steam	Oil	Gas	Wind.
Advisory ...	33	22,627	21,503	3,649	2	3	28	1
Loans ...	30	20,678	19,856	2,687	3	3	22	2
Total ...	63	43,305	£41,359	6,336	5	6	50	3

ZAAI DAMS.

Class.		Estimated cost. £	New Land brought under irrigation.
Advisory	...	...	...
Loans	5	2,550	642
Total	5	£2,550	642

A FURTHER NOTE ON THE DRUG TREATMENT OF BILIARY FEVER OR MALIGNANT JAUNDICE OF THE DOG (CANINE PIROPLASMOSIS).

By WALTER JOWETT, F.R.C.V.S., D.V.H. (Liv.), Veterinary Department, Cape Town.

In the *Agricultural Journal* for October, 1909, the writer gave an account of certain experiments which had been carried out at the Rosebank Experimental Station with the object of testing the newly-introduced treatment for the abovementioned disease. This treatment—introduced by Professor Nuttall, of Cambridge University and his co-worker, Dr. Hadwen, of the Canadian Government Veterinary Service—consisted in injecting either subcutaneously or intravenously (preferably the latter) a solution of one of the Benzidine dyes known as "Trypan blue." At Rosebank this mode of treatment proved completely successful for experimentally infected dogs and also for those few naturally infected animals which one had been able to submit to the curative process prior to the publication to which reference has already been made.

Since September last the writer has applied this Trypan blue treatment to quite a number of dogs which had acquired the disease as a result of natural infection—that is, of course, by the bites of infected ticks.

The following list gives a brief summary of twenty-five such cases. All these animals, be it said, were handed over for treatment by their owners only when it was noticed that something was seriously amiss. Naturally some of the cases were in a more serious condition than others, but they were all obviously ill, and if left to their own resources one has no hesitation in stating that the majority would have succumbed to the malady.

Needless to say diagnosis, on our part, rested solely on the result of microscopical examination—in other words one declared the case "biliary fever" only when it was possible to demonstrate the presence of the causal parasite of biliary fever in films prepared from the patients' blood.

The animal described as No. 10 in the attached list marked* apparently recovered two days after treatment, and at that time he appeared in sound health and no parasites were found in his blood smears on microscopical examination. Seven days later the owner reported that the animal was again ill and he was advised to return it to Rosebank for further treatment. On arrival at the station the patient was found showing well marked symptoms of a canine malady totally different to biliary fever, namely, the disease known in Europe (and elsewhere), as "dog distemper." There was well marked catarrhal discharge from the eyes, nose, etc., and on examination of the blood, however, the presence of piroplasmata was noted therein. Apparently the second disease (distemper), by lowering the vitality of the subject had

Breed.	Weight.	Date of Admission.	Date of Discharge.	Result.	Dose Administered.	Mode of Administration.	Remarks.
1 Fox Terrier ...	14½ lbs.	9. 9.'09	25. 9.'09	Cured	5 c.c.	Subcutaneous	This animal afterwards suffered from relapses—finally recovered—See note in article *.
2 Irish Terrier ...	32 "	27. 9.'09	8.10.'09	Cured	12 c.c.	Intravenous	
3 Airedale Terrier ...	35 "	29. 9.'09	25.10.'09	Cured	13 c.c.	Subcutaneous	
4 Newfoundland ...	65 "	3.10.'09	13.10.'09	Cured	25 c.c.	Intravenous	
5 Fox Terrier ...	18½ "	13.10.'09	20.10.'09	Cured	5 c.c.	Intravenous	
6 St.aniel... ..	39 "	13.10.'09	20.10.'09	Cured	10 c.c.	Subcutaneous	
7 Airedale Terrier ...	30 "	19.10.'09	26.10.'09	Cured	10 c.c.	Subcutaneous	
8 Nondescript ...	...	19.10.'09	22.10.'09	Cured	4.5 c.c.	Subcutaneous	
9 Irish Terrier ...	9 "	20.10.'09	...	Cured	14 c.c.	Subcutaneous	
10 Setter	43 "	20.10.'09	*25.10.'09	Cured	15 c.c.	Subcutaneous	
11 Sheep Dog Puppy	40 "	25.10.'09	1.11.'09	Cured	15 c.c.	Subcutaneous	Case far advanced—recovery hardly looked for.
12 Fox Terrier ...	11 "	26.10.'09	27.10.'09	Died	4.5 c.c.	Subcutaneous	
13 E. Sheep Dog Puppy	35 "	1.11.'09	7.11.'09	Cured	15 c.c.	Subcutaneous	
14 Retriever ...	56 "	4.11.'09	15.11.'09	Cured	25 c.c.	Subcutaneous	
15 Pointer... ..	49 "	10.11.'09	25.11.'09	Cured	20 c.c.	Subcutaneous	
16 Collie	...	13.11.'09	14.11.'09	Died	20 c.c.	Subcutaneous	Severe case. Had been neglected by owner until illness too far advanced.
17 Fox Terrier ...	18½ "	18.12.'09	31.12.'09	Cured	5 c.c.	Subcutaneous	
18 Irish Terrier ...	17½ "	26.10.'09	4.11.'09	Cured	5 c.c.	Subcutaneous	
19 German Sheep Dog	60 "	26.10.'09	4.11.'09	Cured	23 c.c.	Subcutaneous	
20 Collie	48 "	15. 1.'10	5. 2.'10	Cured	15 c.c.	Subcutaneous	
21 Fox Terrier ...	18 "	3. 2.'10	12. 2.'10	Cured	6 c.c.	Intravenous	
22 Pointer... ..	...	8. 2.'10	15. 2.'10	Cured	15 c.c.	Intravenous	
23 Airedale Terrier ...	39 "	21. 2.'10	1. 3.'10	Cured	20 c.c.	Intravenous	
24 Irish Terrier ...	18½ "	2. 3.'10	7. 3.'10	Cured	8 c.c.	Intravenous	
25 Nondescript ...	19½ "	30. 3.'10	5. 4.'10	Cured	9 c.c.	Intravenous	

broken down his immunity against biliary fever, and it was necessary now, in fact, to treat him for two diseases—distemper and the relapse to his original complaint, Biliary fever. During the following few days the animal's condition became much worse, and although a dose of Trypan blue was administered, it exerted no effect whatever on the piroplasmata present in his blood. Trypan red was also administered—this likewise produced little, if any, beneficial effect. This experience fully bears out the observation of Nuttall and Hadwen, namely, that "when a relapse occurs in a dog which has been previously treated, a second dose of Trypan blue seems to exert no influence on the parasite."

Finally with careful nursing and treatment the patient made a complete recovery and quite recently (March) the owner reported that his animal was in perfect health.

Regarding the remaining dogs noted as "cured" in the foregoing test recovery was in every case uninterrupted and unaccompanied with relapses.

The observation on Case No. 10 emphasises the necessity of giving a full dose at the commencement of treatment—erring on the side of "too much" rather than "too little."

Before finally disposing of Case 10 still another and similar example may be mentioned. A puppy was experimentally infected with biliary fever and subsequently injected with Trypan blue solution. This ensured a prompt and complete recovery from the infection. About three months later—the animal still being in good health and condition—he was bled on two occasions for the purpose of further experimental work. Three days after the second bleeding the dog was found dead. Microscopical examination of blood films, as well as smears from the spleen, disclosed the presence therein of piroplasmata in fair numbers. The cause of death then, was biliary fever. The withdrawal of blood had so lowered this animal's vitality, apparently, that the piroplasmata present in his blood were enabled to gain the upper hand, and to bring about a relapse to the disease from which he had recovered three months previously! This is but one further instance illustrating the fact that canines "salted" to piroplasmosis, *when submitted to any adverse influence* are liable to suffer from, and even to succumb to, a relapse of the disease from which they had recovered.

MODE OF ADMINISTERING THE DYE.

The doses quoted in the foregoing list refer in every case to definite quantities of a sterile aqueous solution of Trypan blue. The method of preparing this solution was fully explained in the *Agricultural Journal*, Vol. 35, No. 5, November, 1909. The writer, however, has entirely abandoned the subcutaneous injection of Trypan blue solutions, the injection now being made directly into a vein in every case. By this means one obviates one troublesome sequel of the subcutaneous method—(namely the objectionable local reaction in the shape of swelling and abscess formation), a noticeable feature, in many cases when the dye is injected merely under the skin. Further, by intravenous administration, the curative effect becomes more speedily manifested and in the same connection the patient's recovery is quicker and more certain after this mode of injection. Given proper facilities and with adequate and intelligent assistance in holding and controlling the subject, there is no great difficulty in injecting the dye into a vein even in the case of small dogs and puppies, weighing only 6 or 7 lbs. or so, but the operation is beyond the scope of a layman and on no account should it be attempted by those lacking experience. For such

then, there remains the hypodermic method of administering the dye solution, and whilst this method is by no means so satisfactory as the one just mentioned, still in most cases it will serve to accomplish the object aimed at.

Immunity.—In our former article (*Agricultural Journal*, October number, 1909) it was pointed out that immunity is known to follow recovery from the naturally acquired disease (biliary fever), and, in the case of dogs living in infected areas, this immunity is maintained and reinforced by the further repeated tick infection to which the recovered ("salted") canines are exposed. In the absence of this repeated re-introduction of virus by means of infected ticks, it is doubtful whether the immunity of "salted" animals is of any considerable duration—i.e., lasting for more than from one to two years.

One called attention also to the fact that "throughout the duration of the period of insusceptibility (of "salted" dogs) to further contract the disease, the blood of such animals continues to harbour the virulent agent (piroplasm) and remains infective for "clean" dogs. That is to say if such "recovered blood" be injected into a susceptible canine it will unfailingly produce in the latter the typical disease (biliary fever); no matter whether the blood be introduced (1) by ticks in the natural manner or (2) experimentally by means of a syringe—the effect is the same in either case. Moreover the "salted" dog which supplied the virulent blood may, to all appearance, be in perfect health. True, he still harbours the causal parasite of biliary fever (a piroplasm) in his blood, but the position is this, that by the process of recovery from the malady he has become resistant to the pathogenic action of the micro-parasite whilst other canines which have not passed through an attack of the disease and in consequence acquire a resistance are extremely susceptible to its deleterious influence. Even in the case of the "salted" animal the power of resisting the harmful action of the parasite may be broken down under certain conditions. An instance of this has already been given—a dog, which recovered from biliary fever subsequently became infected with "distemper," and this last mentioned disease so lowered the animal's vitality that the causal parasite of biliary fever which was still present in his blood was enabled to gain the upper hand once more, and the animal suffered from a relapse.

But to return to the subject. It remained to be seen:

- (1) Whether the blood of dogs, which recovered from an attack of biliary fever as a result of the "Trypan blue treatment," was still infective on inoculation into susceptible canines, and,
- (2) Whether, after recovery from the disease in consequence of this treatment, the subject possessed an immunity against subsequent infection equal to that following recovery which sometimes, although rarely, occurs in the absence of any medicinal treatment.

In order to obtain information on these two points, a number of experiments were instituted at Rosebank, and from the records of some of these the following brief extracts have been taken:—

1.—Irish Terrier. Weight, 36 lbs.

August 31, 1909.—Experimentally infected. 5 c.c. of blood from naturally infected case injected subcutaneously. Eighth day after infection, Piroplasmata present in blood on microscopical examination. Tenth day 10 c.c. of Trypan blue solution injected subcutaneously. Result recovered.

Blood withdrawn January 4, 1910, and inoculated into Pointer puppy. Result, animal became infected with piroplasmosis, and succumbed.

January 31, 1910.—Blood withdrawn and 5 c.c. inoculated into each of four mongrel puppies. All became infected.

March 4th.—Blood withdrawn and injected into Irish terrier puppy. Result, positive.

Result.—This animal's blood was still infective nearly seven months after recovery from an experimental infection—such recovery resulting from the Trypan blue treatment. Finally, during March, 1910, the animal was injected with a dose of virulent blood. This produced no effect. The same blood in similar dosage proved fatal for a control (untreated) dog.

The immunity of the Irish Terrier (No. 1) against further infection was thus definitely proved.

2.—Mongrel Puppy. Weight, 7 lbs. 3 ozs.

January 31, 1910.—Experimentally infected. 5 c.c. blood of No. 1 being injected *subcutaneously*. Eighth day after infection piroplasmata were found in the blood. 3.5 c.c. Filtered 2 per cent. solution of Trypan blue was then injected intravenously.

The animal speedily recovered from the infection, and from the date remained in good health and condition.

April 13.—4 c.c. of blood was withdrawn and inoculated *intravenously* into a bull dog, with the following result:—

Piroplasmata appeared in the blood on the 5th day. The animal succumbed on the 7th day after infection.

3.—Another dog.

January 31.—Experimentally infected. Source of blood as in No. 2, but in this case injected *intravenously*. Parasites appeared in the blood on the 4th day following infection. 8 c.c. of Trypan blue solution was then injected intravenously. Recovery promptly occurred. Twelve days later the parasites reappeared in the blood, and the animal was slightly dull and listless. This lasted two or three days, after which improvement in condition was rapid and recovery complete.

March 1st.—5 c.c. blood withdrawn and injected into an Airedale terrier puppy. Result: Death from Piroplasmata.

4.—Mongrel Puppy. Weight, 9½ lbs.

January 31.—Experimentally infected. Source and dose of blood as in No. 2. The temperature rose the eighth day after infection. On the 9th day 4 c.c. of Trypan blue solution was injected intravenously.

Result.—Complete and uninterrupted recovery.

April 13.—4 c.c. blood withdrawn and injected intravenously into a three-months'-old fox-terrier puppy, with the result that Piroplasmata were demonstrated in the puppy's blood three days after the test injection. The puppy died on the sixth day after experimental infection.

CONCLUSIONS.

Further experiments have shown, therefore, that:—

- (1) The blood of dogs which recover from the disease in virtue of the Trypan blue treatment still remains infective for susceptible canines; and

- (2) Such "recovered" animals are immune against further infection, at any rate for a period of six months after recovery.

The duration of the immunity is no doubt very much longer than this in fact it seems reasonable to suppose that it equals that of naturally recovered (*i.e.*, untreated) subjects. Still, of course, a sufficient length of time has not yet elapsed to enable one to affirm this with certainty.

ACTION OF TRYPAN BLUE ON CERTAIN OTHER ANIMAL DISEASES.

It has been shown that Trypan blue acts as a curative for "Red-water" in cattle (due to *Piroplasma bigeminum*) as well as canine piroplasmosis.

On East Coast Fever, unfortunately, it has been shown that the dye exerts no curative action, and as a result of a lengthy series of experiments at Rosebank the writer is now in a position to state that it is likewise without curative effect on the disease of goats and sheep (and also cattle) known as "Heartwater." In the case of this disease Trypan blue failed:

1. To act as a curative after the first appreciable symptom of "heart-water (*i.e.*, elevation of body temperature) became apparent; and
2. To prevent the development of the disease:
 - (a) When mixed with virus at the time of experimental blood infection; or
 - (b) When injected intravenously during the incubation period of the disease—that is after infection and before symptoms of illness made their appearance.

Here, one may also mention that the following drugs were all experimented with in the same manner in the case of "Heartwater," and all proved equally inefficacious:—

Trypan Red.
Arsenious Acid.
Atoxyl.
Soamin.
Cacodylate of Soda.
Iodine.
Perchloride of Mercury.

Whilst the failure of Trypan blue and Trypan red to exert any curative or preventive action on the course of the diseases East Coast Fever and Heartwater is, of course, disappointing, the dyes mentioned—and especially the first named—possess a high degree of efficiency as a curative for the disease "biliary fever" in dogs. The advent, in fact, of this mode of treatment has virtually robbed this hitherto formidable canine scourge of its terrors.

ACTUAL RESULTS OF IRRIGATION, EVAPORATION AND DRY LAND EXPERIMENTS IN CAPE COLONY.

Paper read by R. W. THORNTON, Government Agriculturist, Cape Colony, at the Potchefstroom Irrigation Congress, 1910.

Water, its conservation and use, or, to put it exactly, the duty of water, is an important question in many countries, but one might say an all-important one so far as the agriculturist in South Africa is concerned. Moisture, no matter in what shape, and whether for plant or animal, is the elixir without which life is impossible, and for this reason, especially in South Africa where an enormous extent of the country, though possessing some of the richest soil in the world, is more or less arid, every means must be employed:—

First, to conserve and turn to account our spasmodic and heavy storms and the few permanent rivers we possess;

Secondly, to irrigate the maximum area, so as to give the greatest crop with a minimum of water; and

Thirdly, to conserve the moisture in our soil, whether applied artificially by irrigation or naturally in the shape of rain.

A gentleman once speaking on the subject of agriculture, more particularly in the Cape Colony, said that in his opinion there were three great points to consider in farming in most parts of the Colony; the first was water, the second and greater was water, and the third and greatest was water. This, in my opinion, is absolutely correct, but I would have inserted the words "Judicious use," as the *misuse* of water is in some parts doing more harm than if there were no water at all to use.

The first point I have to deal with is Irrigation, or otherwise the use of water artificially applied to the soil.

Since 1906 carefully supervised irrigation experiments have been conducted in Cape Colony, at first on the Robertson Experiment Station only, but during 1908 in other centres as well, on different soils and under different climatic conditions. The experiments have up to the present been confined to the four cereal crops, wheat, oats, barley and rye, and to our principal fodder crop, lucerne.

Before considering the results of the experiments, it will be as well to give the following table, which will enable everyone to convert any figure mentioned in the water measurements to gallons or any other figure with which they are accustomed to work.

TABLE.

1 Cusec.	=	375 gallons per minute.
1 Cubic Foot	=	6.25 gallons.
1 Cubic Foot	=	62.5 lbs.
1 Gallon	=	10 lbs.
1,000,000 Cubic Feet	=	23 acre ft. (approx.).
1 Acre Foot	=	43.560 cubic feet.
1,000,000 Gallons	=	3,069 acre feet.
1 Acre Inch	=	3,630 cubic feet.
1 Acre Inch	=	22,688 gallons.

1906-7 EXPERIMENTS.

The experiments carried out in 1906 were of the simplest, but a simple beginning was necessary, as there was absolutely no information available at this date which could be used as a basis for future experiments. The experiments were, first, to find out what amount of water on the average constitutes a wetting as applied by the farmer and what number of wettings, and consequently what average total amount of water the farmer applied to his principal crops. To determine this point was a comparatively simple operation, involving no deviation from ordinary farm practice, except the careful measurement of the ground under irrigation and of the water led on to such ground. The crops in the experiments under discussion were given water at such times and in such amounts as they appeared to require it, and the records obtained show that lucerne under a permanent supply of water received 40 to 43 inches per annum, the average wetting being about 5.35 inches, whereas cereals under similar circumstances received from 17 to 25 inches, each wetting being about 4.35 inches. These figures include the rainfall and, in the case of cereals, the preliminary wetting.

1907 to 1910.—Having once ascertained what amount of water was actually being used by the average farmer, exhaustive experiments were arranged and have been carried out constantly from then up to the present date in order to ascertain the effects of scanty, ample and excessive irrigation, the variation in the water supplied being from 8 to 32 inches in the case of cereals and 16 to 40 inches in the case of lucerne.

CEREALS.

The following is the result of an irrigation experiment with barley during the season 1909-10:—

APPLICATION OF WATER: BARLEY.

Plot No.	Total Water intended.	Applications of Water in inches per acre.								Total Rain-fall from Sowing till Harvest	Total Water applied including Rainfall	Weight of crop in lbs. p.a.				
		Preliminary Wetting.		1st Wetting.		2nd Wetting.		3rd Wetting.				4th Wetting.		Date of Harvest.	Weight of crop in lbs. per acre.	
		Date.	Inches.	Date.	Inches.	Date.	Inches.	Date.	Inches.			Date.	Inches.		In Field.	Total and Straw Grain. Chaff.
1	8' less rainfall	22.5.09	4	18.9.09	4	18.10.09	4	—	—	—	—	10.11.09	1580	572	1,008	
2	10'	"	4	"	5	"	5	—	—	—	—	"	956	312	588	
3	10'	"	4	"	4	"	6	—	—	—	—	"	1296	540	766	
4	12'	"	4	"	6	"	6	—	—	—	—	"	1336	524	832	
5	10'	"	4	6.7.09	4	18.9.09	3	18.10.09	3	—	—	"	1280	468	812	
6	13½'	"	4	"	4½	"	4½	"	4½	—	—	"	1584	644	940	
7	18'	"	4	"	6	"	6	"	6	—	—	"	1384	468	916	
8	12'	"	4	"	4	"	4	"	4	—	—	"	1400	452	948	
9	12'	"	4	"	6	"	3	"	3	—	—	"	1580	512	1,068	
10	13'	"	4	"	4	"	3	"	3	27.10.09	3	"	1620	700	900	
11	18'	"	4	"	4½	"	4½	"	4½	"	4½	"	892	296	590	
12	24'	"	4	"	6	"	6	"	6	"	6	"	880	258	622	

Applied in two wettings.

Applied in three wettings.

Applied in four wettings.

The above table is inserted not only to show the result obtained but also the method of application of water to the crop, the manner in which the water is applied having an enormous effect on the yield. The first four plots each received only two wettings of different depths, the next four each three wettings and the remaining four each four wettings, exclusive of the preliminary wetting which was given prior to ploughing. Plot No. 10, which received one 4-inch and three 3-inch wettings, gave the maximum yield, yet plots 11 and 12, which also received 4 wettings, gave the minimum yields, the decrease being evidently due to the fact that *too much* water was applied to 11 and 12. Plot No. 6, which received three 4½-inch wettings, gave the second highest yield, and plot 1, which received two 4-inch wettings, gave the third highest yield. From this it will be seen that the method of application is as important as the actual amount of water applied, and it is also clearly shown that anything over 21 inches tends to reduce the crop enormously. In fact 32 inches of water in the result here shown only produced a little over 50 per cent. of that produced by 21 inches, while the amount of grain was diminished to an even greater extent. One of the principal features of the results of these experiments is the fact that the variation in the yield obtained from respective crops of wheat, barley, oats and rye receiving 16 inches to 21 inches of water, if suitably applied, is not great. This result has been verified by repeated experiments during seasons that varied considerably, and it may therefore be stated that, when arable land in plenty is available and water is scarce, the maximum yield from a given supply of water will be obtained by wettings totalling say, 16 inches. If the maximum yield per acre is desired, however, a total of from 20 to 21 inches must be given.

The results obtained from the wheat experiments are very similar to those of the barley, except that they show that wheat suffers even more severely than barley where subjected to over irrigation. The records of the last season's experiments (1908-09) show a fall of two-thirds in the wheat crop return from plot 12, which received a total of just over 32 inches. Up to the present the experiments conducted under varying conditions all tend to establish as the most suitable standard a total water supply of 18 to 21 inches which should be applied in not more than four wettings of about 3—4 inches each.

LUCERNE.

A good deal of trouble has been experienced in arriving at a standard for lucerne irrigation, owing to the fact that flood water is so largely used for this crop. It has been found that a common flood-water wetting is 12 inches, and frequently very much more than this depth of water is applied to the crop according to the nature of the soil and the water available. The final reports for the season 1909-10 are not as yet to hand, and as these are of the utmost importance it would be unwise to lay down any standard for the present. It appears from past experiments, however, that the best results in number and quality of crops are obtained from a supply of from 24 to 36 inches of water, each crop varying according to the method of irrigation—which here means not only the method in which permanent water is artificially supplied but includes also the conditions introduced by flood-water and cultivation.

1910-11 EXPERIMENTS.

The irrigation experiments for 1910-11 will in every case include cultivation. That means that the plots must be in duplicate and triplicate. Of the triplicate plots two will receive the same amount of water,

only one of them being cultivated after irrigation, and the third will receive less water and will also be cultivated, to find out how much irrigation water can be saved by the use of cultivation, in other words, to what extent cultivation, which is possible of application all over South Africa, may be made to take the place of water, which is scarce in this subcontinent.

METHOD OF MEASURING WATER.

The method employed during these experiments of measuring the water supplied was that of the Cipoletti weir, a simple notched board of special form and size. In using this weir the depth of water and the time occupied in its passing over the horizontal lip of the weir are noted, from which by reference to appropriate tables the quantity of water may be calculated. *Vice versa*, the depth of flow being measured, the time required for a certain quantity of water to pass over can be reckoned, and that amount be put on to the land with tolerable precision.

LEVELLING OF LAND FOR IRRIGATION.

If irrigation is to be carried out successfully, and so as to obtain the best possible results, it is absolutely necessary, in ninety-nine cases out of a hundred, that the land be thoroughly levelled and, where necessary, terraced. Needless to say, unless this is the case in conducting irrigation experiments the results obtained would be totally unreliable and misleading because no water leader, no matter how good, can avoid waste, and I think every farmer in his time has seen plenty of "afloop" water going to waste which, if saved, might have wetted a few more acres of starving crops. What is almost as important as waste, however, is the uneven distribution of water to the crops, and the cost of irrigation, caused by leading water on to unlevel or sloping lands. Uneven distribution of the water means an uneven crop, and an uneven crop means a reduced yield. Again, on land which has been thoroughly levelled and banked one water leader can control almost any given quantity of water, the supervision required being then a mere matter of opening and closing sluices. With a main furrow laid out in a series of sections, each section being levelled and so arranged that the end can be closed and the section thus converted into a still dam, one man with a sufficient head of water can easily irrigate from 5 to 20 beds each 20 to 30 feet wide, at the same time thereby reducing the cost of irrigation to a fraction.

EVAPORATION AND ITS PREVENTION.

When the water has once been put on to the land, the most important question, of course, is how to keep it there, *i.e.*, how to prevent the natural drying out of the soil by evaporation. There is really only one practical answer to this question, *viz.*, cultivate. To show the importance of cultivation, it will be as well to give the nett result of the soil evaporation experiments which have been conducted at the Robertson Experiment Station in the district where the last Irrigation Congress was held. Since starting the experiment a careful record has been kept, and from this record I shall select for the purpose of discussion what proved to be a cold damp month for the district, namely, September, 1909.

Six drums were employed in the experiment, these drums being filled with soil and planted in the ground in such a way as to ensure the temperature and nature of their contents being the same as those of the surrounding ground. Drums 1 and 2 received a wetting equivalent to a 4-inch watering, Nos. 3 and 4 one equal to an 6-inch watering, and

5 and 6 one equal to an 8-inch watering. The soil in the drums referred to by even numbers, *i.e.*, 2, 4 and 6, was cultivated, and that in the remaining three drums left uncultivated, with the following result:—

In the case of Nos. 1 and 2 the moisture saved by cultivation in a period of 30 days proved to be 6 lbs., which is equal to .61 inches of rainfall or a watering of 16,607 gallons per acre. The total loss of the uncultivated drum in the same period was 8 lbs., equal to .81 inches of rainfall, 20.4 per cent. of the total originally supplied or a watering of 22,264 gallons per acre, whereas the loss of the cultivated drum was only 2 lbs., and as 39 lbs. were originally added, the loss is very small, amounting to 5 per cent. In comparing Drums 3 and 4, which received a 6-inch wetting, the difference between the cultivated and the uncultivated drums is the same as in the case of Nos. 1 and 2, *i.e.*, 6 lbs., but the total loss is very much greater, being in the uncultivated drum 10 lbs. equal to 1.02 inches of rainfall, 27,779 gallons per acre or 17 per cent. of the amount added, and in the cultivated drum 4 lbs., 6.8 per cent., or 11,107 gallons per acre. In comparing drums Nos. 5 and 6, which received a wetting of 8 inches, the loss is very great, but the cultivated again shows in the better record, having again lost 6 lbs. less than No. 5, the uncultivated drum. Taking the total loss in this last pair, we find that evaporation took from No. 5 drum a total of 25 lbs., equal to 2.5 inches of rainfall, 32 per cent., or 68,062 gallons per acre. Thus the advantage would appear to lie in applying one small wetting of 4 inches, or 39 lbs. each per month, when the loss would only amount to a total of 16 lbs. instead of 25 lbs. in the uncultivated drums, and 4 lbs. instead of 19 lbs. in the cultivated drums. In comparing the three sets of drums, we find that Nos. 5 and 6 lost considerably more in the first week than the other two sets. This is to be expected on account of the saturated condition of the soil, more moisture being thus exposed to direct contact with the atmosphere than in the drums which received less water. Another thing to be noticed is that on cloudy *cold* days there was little or no loss by evaporation, whereas on a cloudy day with a high temperature evaporation still continued at a fairly high rate.

The above figures plainly illustrate the benefit derived from cultivation, and each of the three cultivated drums lost far less water than the corresponding uncultivated one.

The result of this experiment clearly shew that a vast amount of moisture can be saved by cultivation, amounting in the cool month of September to over half an inch of rainfall, and in the subsequent and hotter months when the loss by evaporation was far greater the results shewed a larger saving of moisture in the cultivated soil.

DRY LAND FARMING.

From the foregoing experiment it is clearly shown that dry land farming can only be carried to a successful conclusion by constant cultivation, and if thorough cultivation is found to preserve the moisture given us in the shape of rain why should it not do the same when irrigation is practised, and so permit us to greatly extend the area under irrigation. In the results of the irrigation experiments it was shewn that the maximum yield from white crops was obtained from about 18 to 21 inches of water, yet in another experiment at the Robertson station, which was conducted on unirrigated land, a greater yield than the above maximum was obtained with a rainfall of only 10.77 inches in twelve months, equal to half the water used for one of the above irrigation experiments, while of the total rainfall only 3.55 inches fell between

the times of sowing and reaping. Thus from a watering during growth of the wheat about equal to one light wetting, or about one-sixth of the water applied per acre in the irrigation experiment, a crop was obtained which bore the proportion of 1.57 to 1 in favour of the dry land, *i.e.*, more than half as great again as that grown under irrigation. The above results were obtained by ploughing the land deeply and thoroughly, and levelling it down, in the same manner as for irrigation, some six months prior to sowing. The land was the re-ploughed, cultivated and harrowed, and after heavy fall of rain it was harrowed to prevent evaporation and store all available moisture. Finally, just before sowing the land was ploughed, harrowed and sub-surface packed, and the seed sown in drills varying in distance from 8 to 24 inches apart. The seeding, in the case of wheat, was at the rate of from 11 to 80 lbs. per acre. The seeding of 30 lbs. per acre gave the best actual yield throughout. Cultivation by means of the harrow in the case of the closely sown plots, and by means of the hoe in those more widely sown, was continued as long as possible in every case. The plots throughout the experiment were arranged in pairs, each receiving exactly the same treatment except with regard to one item, that of sub-surface packing, and it was found that the yield on the average of 16 plots, 8 packed and 8 not packed, shewed an increase of 45 per cent. in favour of the former. Subsurface packing, therefore, is a method of increasing the yield which should not be overlooked. In addition to wheat, plots of oats and lucerne were established on similar lines with equally good results. With lucerne a seeding of 8 lbs. per acre in drills 16 inches apart gave the best results. The cereal crops in all these experiments suffered heavily from a severe storm of wind, which reduced the yields to almost nothing, but as all plots suffered to the same proportionate extent this did not detract from the value of the experiment.

The dry land experiments with mealies and potatoes, carried out on the same land and under the same conditions as reported above, have given excellent results. The actual figures are not yet available, as the crops are being reaped at present, but I may say that the mealies have attained a height of 10 feet, which is most unusual in that locality.

In conclusion I wish it to be understood as my firm opinion, after carrying out the series of experiments to which I have referred in this paper, that with improved cultivation and the judicious use of water there is every reason to anticipate that, in spite of its scanty rainfall and the prevalent lack of surface water, South Africa will take a leading place amongst the food producing countries of the world.

HEART WATER IN SHEEP AND GOATS.

By R. W. DIXON, M.R.C.V.S.

This disease which affects sheep, goats and cattle along the Coastal belt of the South-Eastern and Eastern Districts of this Colony, Transkeian Territories, also portions of Natal and Zululand and a large area of the Transvaal, is so named owing to a clear straw coloured fluid which is often found in the cavity of the chest and heart sac of affected sheep and goats.

It is a specific febrile disease, and like horse-sickness and blue tongue is due to a micro-organism living in the blood; but the parasite is invisible to the highest powers of the microscope.

It is not directly contagious, but is communicable by inoculation with the blood, spleen pulp, cerebro-spinal and thoracic fluids obtained from an affected or recovering animal, but animals which have completely recovered do not retain the infection in the blood. Naturally the disease is communicated from animal to animal by means of the bont tick (*Amblyomma hebraeum*), but in order to do so the tick must have previously fed on an affected or recovering animal. "One tick has been known to be sufficient to communicate a virulent attack."—(Lounsbury.).

LIFE HISTORY OF THE BONT TICK (ORIGINATING CAUSE).

The Veterinary Department had long suspected that ticks were the carriers of Heart-water infection, and a number of negative experiments conducted in the Fort Beaufort district in 1898 supported these suspicions, but in 1899 Mr. Lounsbury settled the matter by carefully conducted experiments which demonstrated conclusively that the species of tick (*Amblyomma hebraeum*) is an agent in the transmission of this disease. He also showed that:—

- (1) The tick is non-infective until it has fed on a diseased or recovering animal.
- (2) The infection does not pass through the egg to its progeny like Redwater, but the infection is spread in a like manner to East Coast Fever, either as nymphs that have fed as larvae on sick animals or as adults after feeding as nymphs.

The bont tick has four distinct life stages. First it exists as an egg, the egg hatches and there appears the larva or seed tick, the larva gains a host, feeds and drops to the ground, and after a period of rest the skin is cast off and then the nymph appears; the nymph locates on a host, feeds and drops off as did the replete larva; again there is a quiescent interval followed by a second moulting and the adult appears.

The adult male lives to fertilise females, and the female finds a host where a male is present, engorges herself and then falls to the ground in or on which she lays her numerous eggs of which there may be fifteen thousand or more.

The life stages of the bont tick are of variable duration largely dependent upon the degree of heat. Development is very rapid through the summer and very slow during the winter and, therefore, both this tick and Heart-water are most common in the warm season. The period through which the bont tick may survive in the veld whilst awaiting a host seems longer in winter than in summer.

In the cool months larvae may live without food for seven months, nymphs six months and adults probably more than 12 months. Mr. Lounsbury had recently some adult red ticks (*Rhipicephalus Evertsi*) in a bottle for eighteen months, and many of the specimens were still alive after the expiration of that period.

At least one year is probably required for a complete life cycle of the bont tick, and even when little time is lost in finding a host it is quite likely that two years may be occupied.

The warmer the weather and the more abundant the stock, the shorter becomes the period required.

SPECIES AFFECTED.

Heart-water affects the Angora and Boer goats, and all their Cross-breeds. All our breeds of sheep (Merino, Afrikanders, Persians and their crossbreeds). Sheep, however, are not nearly so susceptible as goats, more especially the Angora goat. The Persian sheep is peculiar in that they can be infected with Heart-water and pass through a fever period after becoming infected, but rarely die of it. The blood of these sheep during this fever period has proved virulent when inoculated into susceptible sheep and goats.

Cattle also are susceptible to Heart-water and many die, especially young stock, where they are intimately associated with goats and sheep affected with Heart-water. Until recently the true nature of this disease has not been realised by owners of cattle farming on heart-water-infected veld. The disease being vaguely termed "Gall-sickness" (Dronk). Blood taken from cattle in heart-water fever, if injected into susceptible sheep and goats, will prove virulent and lethal.

SYMPTOMS.

Apart from high temperature, there are no definite symptoms during the earlier stages of the disease. Sometimes the attack is so sudden that the affected animal is often found dead in the veld or in the kraal in the morning. The initial rise of temperature is often very sudden, frequently reaching 107° to 108° F., which falls to below normal a short time before death.

After about 24 hours of fever, the affected animal will, on close observation, appear dull, and remain quiet if undisturbed; rumination will cease, but feeding sometimes goes on, if the course is rapid, up to shortly before death. In many cases, however, there is considerable nervous disturbance from the commencement, culminating in fits or series of fits, the affected animal finally dying in convulsions. During the fit the animal shows marked symptoms of brain affection, its head often being thrown backward or to one side, it squints, froths at the mouth, and there is a chewing movement of the lower jaw, and there also may be seen in-and-out movements of the tongue licking the ground.

During the paroxysm of the fit the animal (more especially goats) lies extended on its side, bleats piteously as if in pain, with rapid movements of the fore legs as if galloping. Some die in a comatose condition. The pulse and breathing are quick, and after the fluid begins to form in the

chest and heart sac, the breathing becomes laboured. Generally the fœces are normal, occasionally there is diarrhœa tinged with blood when the bowel lesions are well marked.

Should the affected animal (goat or sheep) recover it loses its fleece.

POST MORTEM LESIONS.

At all times there is a great variety of the lesions, one or more of the typical often being wanted.

The principal *post mortem* lesions are the presence of a straw-coloured sero-albuminous fluid in the cavity of the chest, varying in quantity from a cupful to a quart. The pericardium, or heart bag, is distended with a similar fluid. There is infiltration of serous fluid into the lung tissue. The fluid found in the chest and heart cavities coagulates into a firm jelly immediately after it is exposed to the atmosphere. Blood markings are to be seen sometimes on the outside surface of the heart and under the lining membrane of its cavities, especially that of the left ventricle.

There is often acute congestion of the fourth stomach and the small intestines show patchy hæmorrhages (blood markings). The liver is congested, and the gall bladder distended with green bile, and in consequence, this disease, especially when the fluid in the chest and heart sac is slight or absent, is termed Gall-sickness.

The spleen is usually a little enlarged and more pulpy than normal. A small quantity of serum fluid is frequently found in the abdominal cavity. The brain and its membranes are usually congested, and the spinal fluid is often much increased in quantity.

In some cases where the course of the disease has been rapid, or where the animal has been killed, the lesions are not well marked, often being entirely wanting, except that a little effusion may be seen in the heart sac or chest, and possibly a few blood spots here and there in the heart and other internal organs.

Sometimes a dropical effusion into the heart sac, chest, and abdomen is to be found amongst sheep and goats affected with worms, more especially fluke and wire-worms, but this effusion is easily distinguished from the yellow fluid of Heart-water, in that it does not coagulate, and is thin and watery. The fluids in Heart-water will often be found tinged with blood.

INCUBATION PERIOD.

The period of incubation from natural infection is about 15 days. By inoculation this period varies. A huge injection into the vein of virulent blood causes fever in five or six days (Edington). A medium injection (5 to 10 c.c.) generally takes 8 to 10 days, and a smaller dose as a rule longer still. By subcutaneous injection the period is even more varied, and in one case under observation was no less than 26 days (Spreull).

IMMUNITY.

The experience of the Veterinary Surgeons of this Department who have studied this disease is that absolute immunity is very difficult to produce. Sheep and goats which have recovered from an attack of Heart-water have an immunity, but the immunity obtained from one particular strain can be broken down by another strain.

This is seen in the veld where goats have been known to sicken of this disease twice within twelve months, also both goats and sheep which have been bred and continuously grazed on Heart-water infected farms will succumb to the disease after having been for such long periods as two or more years on the infected veld.

Spreull quotes two goats which passed through three attacks of Heart-water and finally died of this disease. All his experiments go to show that immunity is produced very slowly and is very difficult to acquire. It is possible also that a continuous tick infection is necessary for its maintenance.

LETHAL DOSES OF HEART-WATER BLOOD.

Intravenously a very small quantity is necessary to produce a fatal attack, 1 c.c. has often proved lethal; an injection of 5 c.c. intravenously will probably kill 95 per cent. of susceptible goats. Amongst sheep the loss is not likely to be so great.

Subcutaneously.—The amount varies considerably. Robertson states "in endeavouring to immunise goats by gradual increasing doses of virulent blood found that 2-c.c. blood was tolerated by six goats given subcutaneously without any re-action, the animals stood this amount twice; on raising the dose, after an interval of three weeks, to 3 c.c. each, four out of the six died of typical Heart-water."

Spreull found that with full grown goats a subcutaneous inoculation of 5 c.c. is frequently dangerous. Sheep, he found, will stand rather more than this dose, yet yearling merinos succumb to a primary injection of 4 c.c.

Its action subcutaneously is very uncertain, sometimes 5 c.c. is found a lethal dose, and at other times as much as 20 c.c. can be given without killing or making the animal (sheep or goats) visibly sick.

Unlike the virus of Horse-sickness and Bluetongue, Heart-water blood loses its virulence in three days or even sooner, and cannot be preserved by the addition of preservatives. It is also destroyed by dessication.

PREVENTIVE INOCULATION.

A long series of experiments have been carried out principally by Veterinary Surgeon Spreull, with the object of discovering a safe and effective method of preventive inoculation, but the problem is still unsolved.

As far back as 1898-99 the writer conducted a series of experiments with the same object. The following are some of the methods tried:—

1. *Inoculation with Bile.*—A number of experiments with bile obtained from an animal which died of the disease were tried in varying doses, but it was found that bile gave little or no immunity, although some farmers extolled it highly.

2. *The Blood and Serum of Cattle and Horses.*—Inoculations with the serum of horses and cattle that had been fortified by injections of large doses of virulent blood were tried in conjunction with virulent blood taken from cattle, sheep, and goats, which gave but slight immunity against either artificial or natural infection.

3. *Preserved Virulent Blood.*—Inoculations with virulent blood which was preserved (a) by adding 5 per cent. glycerine or (b) $\frac{1}{4}$ per cent. carbolic acid in watery solution, were tried. No reactions followed, consequently there was no immunity.

4. *Virulent Blood (Citrated.)*—This was mixed in normal saline solution 1 to 3, and kept for varying short periods and then injected intravenously, but it proves very irregular in its action and effects.

5. *Antithermal Blood.*—Experiments were undertaken with the object of ascertaining the period at which the blood becomes virulent in an animal sickening from Heart-water. This showed that the blood becomes virulent 24 to 48 hours before the onset of the fever. In one very rapid case the virulence of the blood appeared six clear days after the intravenous injection of virulent blood.

6. *Small Intensive Doses of Virulent Blood.*—This series of experiments were undertaken with the object of intensifying the modified reaction obtained by the injection of small doses of virulent blood intravenously, but proved unsatisfactory, the reactions being uncertain and at other times dangerous.

7. *Serum of Recovered Animals.*—Serum taken from sheep and goats that have recovered, and after being hyper-immunised by repeated injections of virulent blood, has been found to have strong protective powers, but so far immunisation by this method has not proved satisfactory, owing to failure to produce reactions with certainty; worse still, when such reactions were produced, no great degree of immunity resulted.

8. *Heated Blood Experiments.*—Inoculation with virulent blood which had been subjected to varying degrees of temperature gave uncertain and unreliable results. Robertson states "that Heart-water blood maintained its virulence up to and at 50° C. heated for 10 minutes; at 51° C. blood heated for 10 minutes for two animals tested proved virulent, but heating at 52° C. for 7 minutes rendered the virulent blood inert in every case. No reaction followed the intravenous or subcutaneous inoculation of blood rendered inert by heating, and no immunity is conferred by such inoculation."

He concludes that heating Heart-water blood with the idea that heat might effect some modification of the virulence did not prove satisfactory, for he found no temperature at which the blood, when injected into an animal, produces modified Heart-water.

9. *Repeated Subcutaneous Inoculations of Virulent Blood.*—These series of experiments gave the most promising results, and Spreull, who conducted these experiments, recommended the following method, viz., three vaccines of freshly citrated or defibrinated blood injected subcutaneously at intervals of one month between each vaccine.

For full-grown goats he found a subcutaneous injection of 5-c.c. of blood is frequently dangerous and fatal. It was found necessary, therefore, to start with a smaller dose than this.

The following table of doses was put forward by him as tentatively safe:—

	1st Vaccine.	2nd Vaccine.	3rd Vaccine.
Kids and Lambs	1.5 to 2 c.c.	2 c.c.	3 c.c.
Goats and Sheep, 2 tooth ...	3 c.c.	3 c.c.	4 c.c.
" " " 4 tooth ...	2.5 c.c.	3.5 c.c.	5 c.c.
" " " 6-8 tooth	4 c.c.	4 c.c.	6 c.c.

Sheep will stand rather more than these doses yet yearling Merinos sometimes succumb to a primary injection of 4 c.c.

The danger from this method seems to be greatest after the first and second vaccine, the third can safely be made much larger than either of the two preceding it.

It was found that complete immunity is not acquired until a really severe reaction occurs—in fact, unless a fever reaction has been produced but little immunity can be expected.

In any such cases a fourth vaccine would doubtless add greatly to the protection conferred.

The fact that (1) immunity from one particular strain of virus sometimes does not protect from another, and also (2) the varied susceptibility of different breeds of sheep and goats and also different sheep and goats of the same breed met with in this disease, and (3) that in order to obtain a strong immunity sufficient to protect an animal permanently whilst on the veld, a very severe reaction is necessary, involves a considerable amount of danger and loss in order to attain this amount of protection.

On this account Mr. Spreull did not feel justified in recommending these inoculations as a safe and satisfactory method of immunising sheep and goats against Heart-water.

In practice it was found of some use on Heart-water infected farms, as it proved that a large percentage could be protected sufficiently to allow sheep farming to be carried on profitably.

PREVENTION.

From the knowledge gained of the life cycle of the bont tick and the manner in which it communicates Heart-water, and as it is now considered that this disease is only communicated naturally from animal to animal (sheep, goats, and cattle) by means of the bont tick, it becomes manifest that the only effective method of suppressing this disease is by getting rid of the bont tick.

Apart from the fact that this tick is a disease carrier, it does great damage to stock otherwise by causing suppurating sores, destruction of the udder of cows and teats of heifers, and also a considerable amount of lameness and loss of condition to small stock.

Knowing this, the best method which at present can be recommended or adopted in dealing with Heart-water is removal of the cause, that is eradication of the bont tick, for the presence of the bont tick upon a farm is now generally considered as bad an evil as Heart-water itself.

The only practical method in this country by which the bont tick is to be eradicated is by dipping or spraying (with an effective tick-destroying dip) all stock upon which ticks feed, at intervals short enough to prevent the female ticks from maturing and breeding.

Adult ticks of most species are found mostly on cattle. By dipping these animals regularly every fortnight the number of ticks and their propagation can be enormously reduced.

The beneficial results of such dippings can be seen every day in most of our coastal districts where the bont tick used to thrive, and where regular cattle dippings are now practised. In the Divisions of Fort Beaufort, Komgha, East London, King William's Town, Victoria East, Albany, Alexandria, etc., where formerly there were farms that once used to be splendid sheep runs, and which became of no value for sheep and goats when the bont tick appeared. These have now been reclaimed by regular cattle dippings and occasional dippings of the small stock.

It is found in practice that dipping an infected Heart-water flock in an arsenical dip sufficiently strong enough to kill the ticks will surely stop Heart-water for the time being.

MEDICINAL TREATMENT.

A large number of remedies have been tried, but in our hands none have proved successful.

ANIMAL DISEASES—CONTAGIOUS AND INFECTIOUS.
Summary of Outbreaks of Contagious and Infectious Animal Diseases Scheduled
under Act No. 27 of 1893.
Still under Quarantine on 31st March, 1910.

DISTRICT.	African Coast Fever.	Anthrax.	Epizootic Lymphangitis.	Glanders.	Lung-sickness.	Redwater.	Scabies (Equines.)	Spon-siekte.	Totals.
Albert	...	...	...	1	...	...	...	...	1
Alexandria... ..	...	1	...	...	...	...	...	...	1
Barkly West	...	4	...	...	...	...	...	...	4
Bathurst	...	...	...	...	...	...	...	1	1
Calvinia	...	...	...	1	...	...	...	...	1
Cathcart	...	...	...	...	...	...	...	1	1
East London	...	3	...	...	8	...	...	4	15
Hay... ..	...	1	...	...	...	...	...	...	1
Herschel	...	1	...	...	...	...	...	...	1
Hope Town	...	...	...	...	1	...	...	...	1
Humansdorp	...	...	1	...	...	...	3	...	4
Kimberley	...	...	...	1	...	...	...	...	1
King William's Town	...	1	...	...	7	...	...	...	8
Middeldrift	...	1	...	...	...	...	...	...	1
Komgha	...	2	...	...	4	...	...	1	7
Kuruman	...	1	...	...	2	...	...	...	3
Mafeking	...	...	...	...	...	...	...	3	3
Uitenhage	...	...	1	...	...	...	...	...	1
<i>Tembuland.</i>									
Umtata	...	...	...	...	5	...	...	...	5
Engcobo	...	...	...	...	30	...	...	...	30
Xalanga	...	1	...	...	...	...	...	...	1
St. Mark's	...	...	...	...	4	2	...	1	7
Mqanduli	...	...	...	...	2	...	...	2	4
Elliotdale	...	...	...	...	4	...	...	...	4
<i>Transkei.</i>									
Butterworth	...	...	...	...	1	...	...	...	1
Kentani	...	...	...	...	1	...	...	4	5
Nqamakwe	...	...	...	...	9	2	2	6	19
Tsomo	...	...	...	...	5	2	...	...	7
Idutywa	...	...	...	...	12	...	...	...	12
Willowvale	...	...	...	...	8	...	...	17	25
<i>Pondoland.</i>									
Libode	...	...	...	...	2	...	...	1	3
Ngqeleni	...	...	...	...	1	...	...	...	1
Lusikisiki	...	...	...	1	6	...	...	...	7
Flagstaff	...	...	...	...	1	...	...	1	2
Tabankulu	...	...	...	...	3	...	...	...	3
<i>East Griqualand.</i>									
Mount Ayliff	...	...	...	...	1	...	...	...	1
Umzimkulu	1	...	...	...	...	1	1	7	10
Qumbu	...	...	...	...	3	...	...	...	3
Tsolo	...	...	...	...	10	...	...	...	10
Mount Frere	...	...	...	...	3	...	...	...	3
Mount Fletcher	...	...	...	...	...	...	...	1	1
Totals	1	16	2	4	133	7	6	50	219

GEORGE ROWE, for Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 2nd May, 1910.

AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS.

BEING A COURSE OF LECTURES ON AGRICULTURAL
ZOOLOGY, DELIVERED BY DR. J. D. F. GILCHRIST,
PROFESSOR OF ZOOLOGY AT THE SOUTH AFRICAN
COLLEGE, IN CONNECTION WITH THE TECHNICAL
EVENING CLASSES INAUGURATED BY THE SCHOOL
BOARD OF THE CAPE DIVISION.

(Continued from page 432.)

Order VIII.—Hemiptera or Bugs, Plant-Lice, Scale-Insects, Lice, etc.

In this order there are *two pairs* of wings, the first pair being often horny or leathery at the base (sub-order Heteroptera), or they may be quite clear and membranous (sub-order Homoptera); in certain parasitic forms (sub-order Parasitica) there are no wings, as for instance in lice. The mouth parts are adapted for *piercing and sucking*, and consist of a jointed beak or proboscis (the labium), which forms a sheath, in which lie four fine lancet-shaped organs (probably the transformed mandibles and maxillae). *Metamorphosis is incomplete*, larva, pupa, and imago differing little from each other.

The wings are very diverse in this group, the most characteristic feature being the mouth parts, which are adapted for sucking the blood of mammals, or the juices of plants. It is on account of this second habit, and the consequent serious injury to vegetation of all kinds, that they constitute one of the most important orders of insects with respect to human welfare. Fortunately there are numerous animals which prey upon them, but "if anything were to exterminate the enemies of the Hemiptera, we ourselves should probably be starved in the course of a few months." (Sharp.)

Sub-Order I.—Heteroptera.

Family I.—Pentatomidae.

A common and typical example of this large family and of the winged Heteroptera is the Fruit-Bug, *ANTESTIA VARIEGATA*, common in Cape Colony and Natal. It may be found on Table Mountain on the Taaiibosch (*Rhus glauca*). It injures fruit by puncturing it. The Bagrada-Bug *BAGRADA HILARIS* is another plant bug which is one of the chief garden pests.

Perhaps a more familiar example of the Heteroptera is the Stink-Bug, *HOLOPTERNA VALGA* (Fig. 112a.), common in gardens. It is a large, brown insect, with triangular shoulder-like projections at the anterior end of the body. Most Hemiptera, and more especially the Heteroptera, have well-developed glands on the body, which give off a strong odour, but this Stink-Bug is so overpowering in this respect that it apparently keeps its enemies, for it has very few, at a distance. The insect causes damage to plants by puncturing young shoots. Its relatively large brown eggs may be found arranged in single bead-like rows on or near leaves.

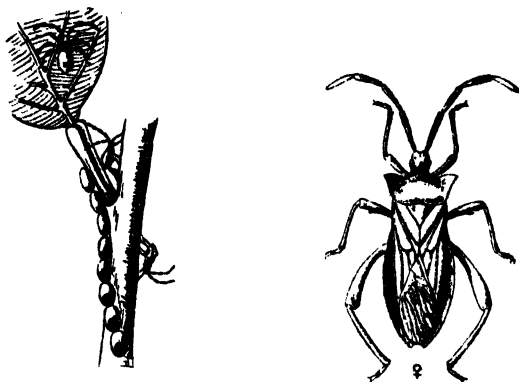


Fig. 112A.—*Holopterna valga*, the Stink-Bug, with twig showing its eggs and newly hatched young. Natural size. (Report of the Cape Government Entomologist).

Other stinking Heteroptera in South Africa are the bright red "Soldier," *ODONTOPUS*, often occurring in pairs on bushes, and the largest of all South African Heteroptera, *BELOSTOMA*, a kind of "water-scorpion," found in streams and pools.

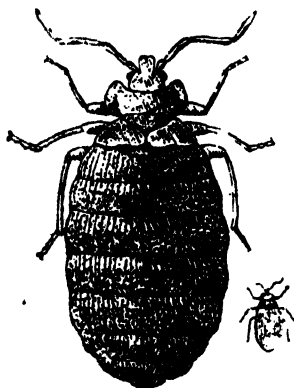


Fig. 113.—*Cimex lectularius*, the Bed-Bug. Enlarged and natural size. (Fuller after Marlatt).

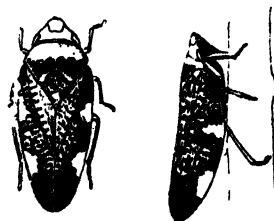


Fig. 114.—*Aphrophora gossua*, the Spittle-Bug (Fuller).

Family II.—Cimicidae or Bugs.

This family contains the Bed-Bug, *CIMEX LECTULARIUS* (Fig. 113), one of the most detested of insects, and one which, owing to favourable climatic conditions, flourishes in South Africa. It has no definite breeding season, and will continue to increase as long as temperature conditions are

favourable. The white oval eggs are laid in cracks and crevices; the young which hatch out from them are similar to the adult though of a lighter colour. The adult, which is nocturnal in its habits, has no wings; it is characterised by a peculiar odour, and its painful and even poisonous bite. It has apparently been associated with man from time immemorial, and is said to prefer the company of civilised man, and even to have acquired some of his cunning.

Sub-Order II.—Homoptera.

Family I.—Cercopidae or Frog-Hoppers.

Some of these have the habit of secreting a fluid, which covers them in the form of bubbles or foam, called cuckoo-spits or frog-spits; the perfect insects are known as frog-hoppers, as they are very active leapers. Some eject fluid, which appears to fall from the trees in which they are lodged, and which are, for this reason, sometimes called weeping trees. *APHROPHORA GROSSA* (Fig. 114) is a South African example, common in peach trees.

Family II.—Cicadidae.

These are usually large insects with transparent wings. They are well known for the continuous shrill noise, which is made by the male only. *PLATYPLEURA* and *CICADA CATENA* occur in South Africa, where the Cicada are abundant and very much in evidence on account of their rather noisy demonstrations. The North American *Cicada septemdecim* has a very long life of seventeen years underground before it emerges as a mature insect.

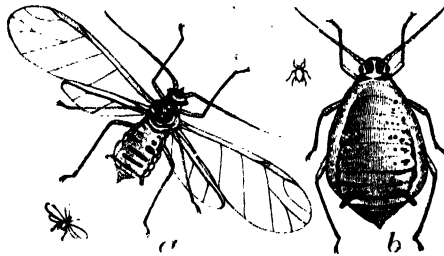


Fig. 115.—*Aphis brassicae*, the Cabbage-Aphis; *a*, winged male, enlarged and natural size; *b*, wingless female, enlarged and natural size. (From U.S.A. Dep. Agr.)

Family III.—Aphidae, Plant-Lice, or Green-Fly.

Though these are small, soft, unprotected insects, they are well able to hold their own in the warfare of animal life. This they do by constant feeding and early parthenogenetic reproduction. The young can reproduce when only ten to twenty days old, and this may go on for several generations. Such a method of increase is just as effective, if not more so, than the production of large numbers of young by one individual. Both winged and wingless individuals may be produced. After a time, when the temperature falls and food is not so abundant, or on deliberate abstinence from food, sexual individuals are produced and fertilised eggs are laid. These in their turn hatch into parthenogenetic females.

Numerous insect birds feed on aphides, the supply of which is kept up in the manner indicated; ants, however, as already mentioned, keep them alive for the sake of the sweet "honey-dew" which they secrete from

their alimentary canal. It was formerly thought that this was secreted from the two projecting tubes on the body, but these are now known to secrete a waxy substance.

APHIS (Fig. 115), the Green-Flies, are perhaps the most familiar examples of the family. They are troublesome to gardeners and are known by them as "blight."

SCHIZONEURA LANIGERA, the Woolly-Aphis, is also common, and does considerable damage. The body is of a brown colour, and, when crushed, gives a red stain; hence the name Blood-Louse. The insect is covered completely by a mass of white woolly substance, which is secreted from glands in the body. They injure not only the foliage, but the branches and roots of vegetation, on which they cause large irregular growths.

PHYLLOXERA VASTATRIX, the Vine Phylloxera, is one of the most important of the Aphidae from an economic point of view, and illustrates well the complicated life history of some members of this family. It is a native of North America, where, however, it does little damage, as the roots of the vines there are able to resist its attacks. On its introduction into Europe, however, it wrought great havoc among vines, and, as is well known, a similar calamity followed its introduction into South Africa. The Vine Phylloxera is *P. vastatrix*, another which attacks the oak is *P. quercus*, a species also common in South Africa.

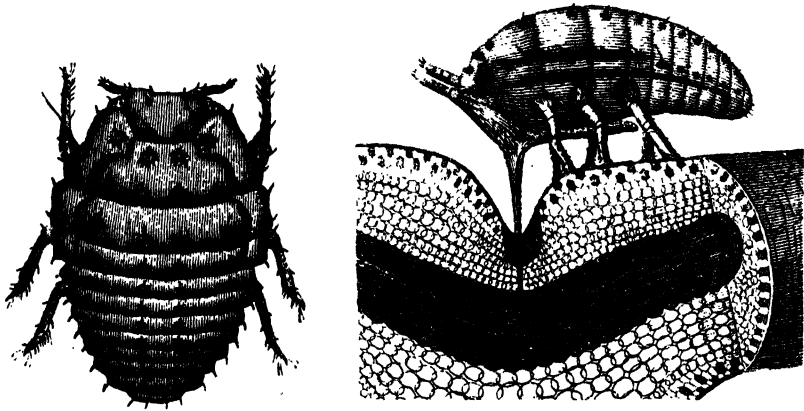


Fig. 116.—The Vine Phylloxera, *Phylloxera vastatrix*, the root infesting form. The figure on the right shows how the insect pierces the young root and sucks the juices of the vine. Enlarged fifty times. (Cornu and Delamotte).

Life History of Phylloxera vastatrix.

The *root infesting form*, which does the damage, may be found with its proboscis firmly embedded in the tissue of the young roots, the juices of which it sucks (Fig. 116). These fixed forms lay 30 to 40 eggs parthenogenetically, which, if temperature conditions are suitable, hatch out in about a week, producing larvae, which, after moulting, crawl about a little and then fix themselves to the roots. This second generation, like the first, produces eggs, and many similar generations may follow, so that in a short time the numbers may increase very rapidly.

After a time *winged females* are produced, and these crawl out of the ground and fly, or rather are carried by the wind to other regions, thus spreading the disease (Fig. 117). These females, like the root investing form, lay eggs, which are capable of development without fertilisation—there are as yet no males. The eggs, which are laid on the leaves of the young vine, are not all the same, some being larger than others.

From these eggs *males and females* are produced, males from the smaller, and females from the larger (Fig. 118). They are very small, and have no wings, proboscis, nor alimentary tract, though the sexual organs are well developed. After fertilisation the female lays one large egg, called the "winter egg," as it is capable of resisting severe cold. It is lodged in a crevice in the bark of the vine.

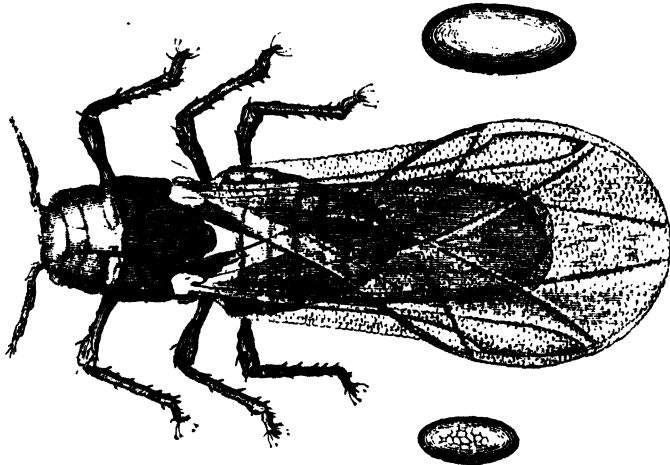


Fig. 117.—The Vine Phylloxera, *Phylloxera vastatrix*, the winged form, with its two kinds of eggs. The larger which gives rise to females and the smaller which gives rise to males. Enlarged fifty times. (Cornu and Delamotte).

On favourable conditions recurring a *gall forming female* hatches out from this egg (Fig. 119). It climbs up to a young leaf, and inserts its proboscis in its upper surface, causing a depression, which soon enlarges, so that it appears as a projecting gall on the under surface, and in this the insect lives. The female, which is wingless, lays eggs parthogenetically, and these give rise to progeny, which are also gall-formers; several

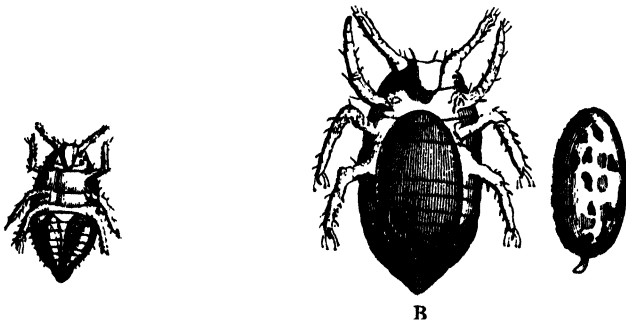


Fig. 118.—The Vine Phylloxera, *Phylloxera vastatrix*. A, male (ventral surface); B, female (ventral surface) and winter egg. (Girard).

generations may thus succeed each other; sooner or later, however, some of them begin to descend into the ground, and attack the young roots, thus completing the cycle.

There are, therefore, four chief transformations, which the insect undergoes during the course of its life history. The root infesting stage is that in which the most damage is done, and, as is well known, the means of combating the plague is by grafting the vine on to the American

Phylloxera-resisting roots. The winged form does not seem to spread the disease very far naturally (there are still some old uninfected vineyards at the Cape), but these small insects may readily be carried by man and in traffic.

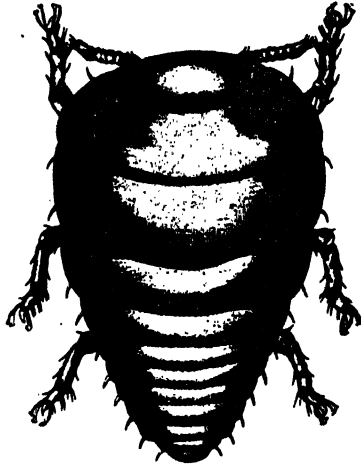


Fig. 119.—The Vine Phylloxera, *Phylloxera vastatrix*, the form which causes galls on the leaves. Enlarged fifty times. (Cornu and Delamotte).

Family IV.—Coccidae or Scale-Insects and Mealy-Bugs.

These are small insects. The male is winged, but the female often becomes so degenerate that it hardly resembles an insect, nor indeed a living animal at all, but appears as a small scale-like structure, adhering firmly to vegetation. The scale is composed of excreted matter and the shed skins of the body. In some cases it takes the form of a rounded sphere of glittering material, as in the so-called "ground pearls," used as ornaments by the natives in South Africa; in other cases it appears as a white mealy or powdery substance as in the Mealy-Bug. These excretions of the body are sometimes of commercial value, and afford various kinds of wax. The Coccidae, like some other insects, produce sweet "honey-dew," and this is in some countries used for food, as, for instance, that produced by *LECANIUM MANNIFERA*, which the Arabs call "man," and which is probably the manna mentioned in the Book of Exodus. Some kinds of dye are made from the bodies of the Coccidae, as, for instance, a red dye known to the Greeks and Romans, which was replaced by the dye from the Cochineal Insect (*COCCUS CACTI*) discovered in America, this, in its turn, giving place to the modern dyes derived from coal tar products. Like the Aphidae, the Coccidae increase rapidly, but by a different method, not by reproducing at very early stages in the life of the individual, but by one individual producing many young. As an instance of this the San Jose Scale, *ASPIDIOTUS PERNICIOSUS*, one of the most destructive of scales, may be cited; one female of this insect, according to Lintner, may under favourable circumstances give rise in one year to 3,216,080,400 young.

ICERYA PURCHASI (Fig. 120), the Australian Bug, Dorthesia or Cottony-Cushion-Scale, is an insect well known in South Africa on account of the destruction it causes to orange and other citrus trees, as already noted. The first of its popular names refers to the original home of the insect, the second is an erroneous generic name often used in South Africa,

and the third is a descriptive term applied to it in North America. The adult females (Fig. 120, A) assume the form of cushion-like masses, which occur in clusters on the stems and branches of trees and shrubs. The hinder part of the insect is of a white cottony appearance, with longitudinal stripes; this is the egg-bag, and is made up of waxy thread-like secretions of the body. As many as 200 eggs may be contained in the

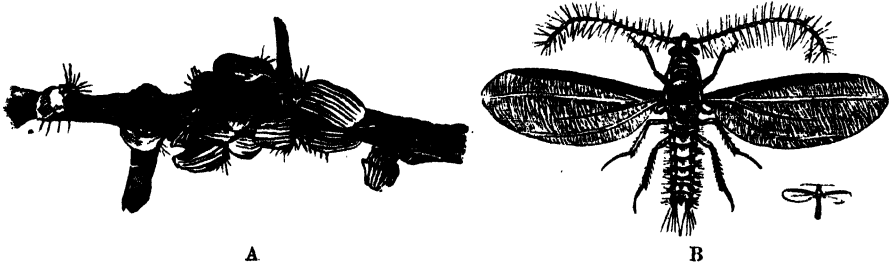


Fig. 120.—The Australian Bug, *Icerya purchasi*. A, a number of females on a twig (natural size); B, a male, enlarged and natural size. (Ormerod).

sac. At first the insect is able to move about, but, as the egg-sac and its contents grow, it becomes more stationary, and finally remains fixed at one spot. The eggs then begin to hatch out and the young crawl away. The male (Fig. 120, B) is much smaller than the female, and is provided with wings.

ORTHEZIA INSIGNIS (Fig. 121), unlike many other scale insects, carries its egg-sac, a white, conspicuous, ribbed protrusion of waxy substance, about with it, and can itself move at all stages of its existence. It attacks garden and hot-house plants. Though the body is only about a tenth of an inch, the whole, including egg-sac, is four or five times this length.

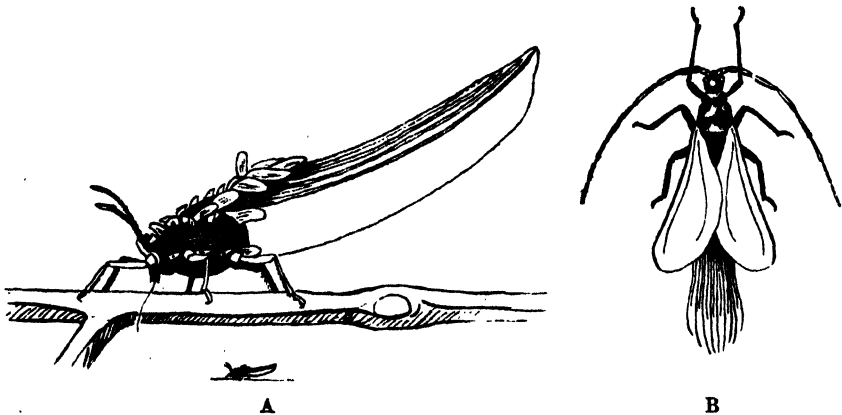


Fig. 121.—*Orthezia insignis*; A, female, enlarged and natural size; B, male, enlarged. (Lounsbury and E. E. Green).

Mealy-Bugs, such as *DACTYLOPIUS LONGISPINIS* and *D. CITRI* (Fig. 124, A and B), are of a fairly large size. The oval margin of the body is provided with teeth like projections, and sometimes there are long hair-like processes at its posterior end. They derive their popular name from the fact that the body is covered by a mealy-like substance of a white colour, so that the presence of the insects is often made known by white masses lodged at the bases of the branches or leaves of trees. Their eggs are covered by a similar substance.

The Soft Scale, *Coccus* (*Lecanium*) *hesperidum*, has no scale proper, but a mere hardening of the back, which is smooth, convex, and of a slightly brown colour. It does not do much harm, but associated with it

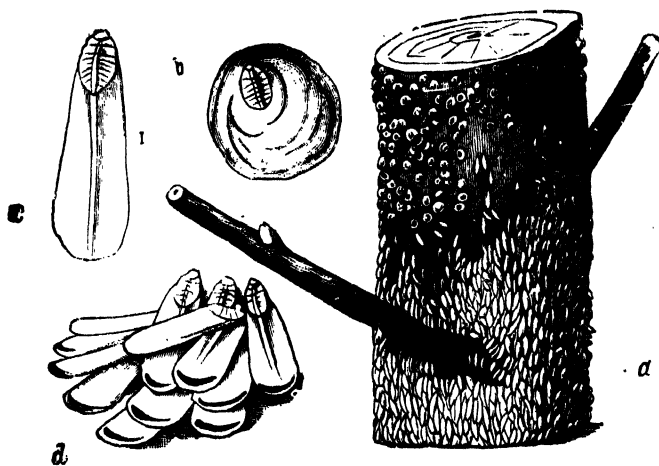


Fig. 122.—The White Peach-Scale, *Aulacaspis* (*Diaspis*) *pentagona*; a, male and female scales; b, female scale; c, male scale; d, group of male scales. a in natural size, the others are enlarged. (From U.S.A. Dept. Agr.)

is a black fungus, "sooty mould" or "fulmagine," which lives on the sweet honey-dew secreted by the scale and renders plants unsightly, besides blocking up the pores of the leaves.

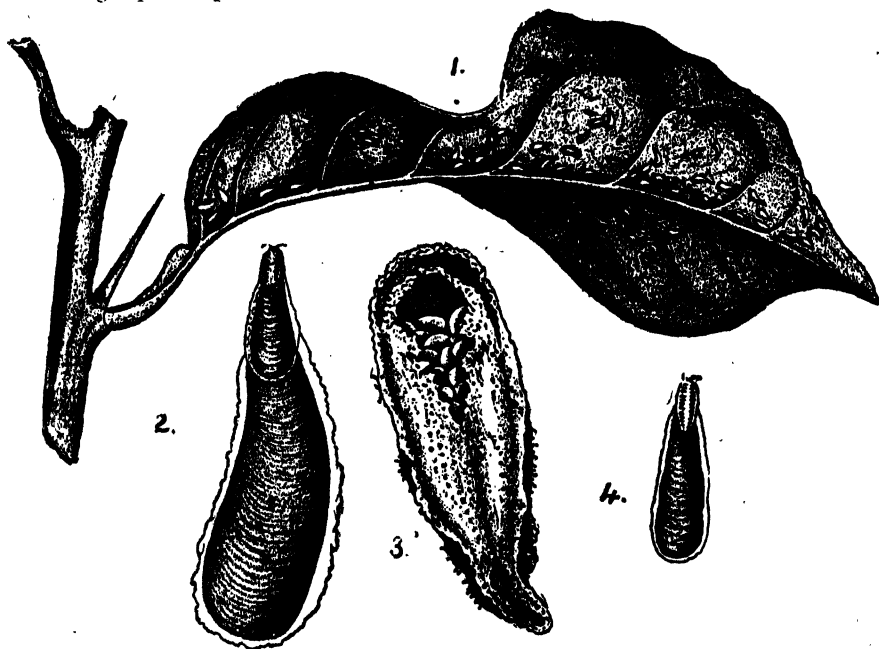


Fig. 123.—The Mussel- or Purple-Scale, *Lepidosaphes beckii* (*Mytilaspis citricola*); 1, scales on leaf of orange; 2, scale of female from above; 3, scale of female from below; 4, scale of male. 1 is natural size, the others enlarged. (U.S.A. Dep. Agr.)

The following are some of the more important Coccidae in South Africa which assume the hard scale-like form:—

CHRYSOMPHALUS (ASPIDIOTUS) AURANTII, the Red Scale, is very injurious to citrus trees throughout the world. The scale of the female is reddish or reddish brown; it is about the size of a pin's head, rather flat, with a projection or prominence in the centre, circular in outline, but with a deep cleft at one side. The scale of the male is much smaller,

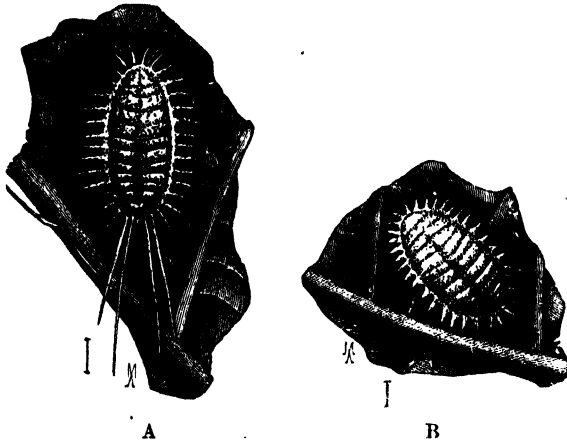


Fig. 124.—Mealy Bugs: A, *Dactylopius longispinnis*; B, *Dactylopius citri*. (U.S.A. Dep. Agr.)

rather oblong in outline, and the prominence is towards the margin. **DIASPIS PENTAGONA** (Fig. 122), the White Peach Scale, is found on Peach, Mulberry and Passion Flower. The scale is circular, white, with a yellow prominence on one side. **LAPIDOSAPHES BECKII (MYTILASPIS CITRICOLA)** (Fig. 123), the Mussel or Purple Scale, is a great pest of oranges. The scale is mussel-shaped, often distinctly convex, purple when fresh, and brown when old; attached to the anterior end are two coats of skin. The scale of the male is of a dark brown colour, somewhat like that of the female, but smaller.

Sub-Order III.—Parasitica.

The third sub-order of the Hemiptera includes wingless parasites living on the skin of mammals and commonly known as lice or Pediculidae. They are not biting lice like Bird-lice (Mallophaga, p. 95), but are true parasites, which pierce the skin and suck blood with the aid of a proboscis. **PEDICULUS CAPITIS** (Fig. 125) is the Head-Louse, **P. VESTIMENTI**, the Clothes-Louse, and **PTIRIUS INGUINALIS**, the Body-Louse of man. It has been stated that the natives of South Africa have a variety of an orange colour. Species are found on domestic animals, with the exception of the sheep and cat, and these all belong to the genus **HAEMATOPINUS**.

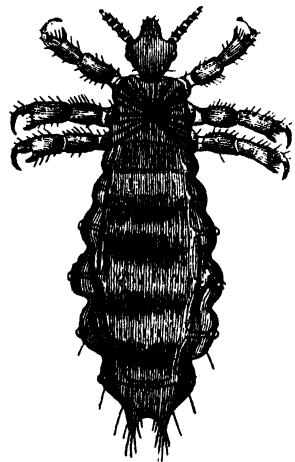


Fig. 125.—*Pediculus capitis*, the Head Louse. (Railliet).

Classification of Insects..

Order 1.—Aptera, *e.g.*, Lépisma, Podura.

Order 2.—Orthoptera.

- Family 1.—Forficulidae, *e.g.*, Forficula.
 „ 2.—Blattidae, *e.g.*, Periplaneta.
 „ 3.—Mantidae, *e.g.*, Mantis, Pyrgomantis.
 „ 4.—Phasmidae, *e.g.*, Bacillus.
 „ 5.—Acridiidae, *e.g.*, Pachytylus, Acridium.
 „ 6.—Locustidae, *e.g.*, Eugaster.
 „ 7.—Gryllidae, *e.g.*, Gryllus, Gryllotalpa.

Order 3.—Neuroptera.

- Family 1.—Termitidae, *e.g.*, Termes, Hodotermes.
 „ 2.—Mallophaga, *e.g.*, Lipeurus, Menopon.
 „ 3.—Odonata, *e.g.*, Calopteryx.
 „ 4.—Psocidae, *e.g.*, Atropos.
 „ 5.—Ephemeridae, *e.g.*, Ephemera.
 „ 6.—Hemerobiidae, *e.g.*, Myrmeleon, Chrysopa.
 „ 7.—Phryganeidae.
 „ 8.—Thripidae, *e.g.*, Thrips.

Order 4.—Hymenoptera.

- Family 1.—Formicidae, *e.g.*, Dorylus.
 „ 2.—Apidae, *e.g.*, Apis, Trigona, Xylocopa.
 „ 3.—Vespidae, *e.g.*, Polistes.
 „ 4.—Eumenidae, *e.g.*, Eumenes.
 „ 5.—Tenthredinidae, *e.g.*, Eriocampoides.
 „ 6.—Cynipidae.
 „ 7.—Chalcididae, *e.g.*, Blastophaga.
 „ 8.—Ichneumonidae.

Order 5.—Coleoptera.

- Family 1.—Scarabeidae, *e.g.*, Eriesthis, Heteronychus.
 „ 2.—Coccinellidae, *e.g.*, Vedalia, Chilomenes.
 „ 3.—Ptinidae, *e.g.*, Sitodrepa.
 „ 4.—Elateridae.
 „ 5.—Cantharidae, *e.g.*, Mylabris.
 „ 6.—Bruchidae, *e.g.*, Bruchus.
 „ 7.—Chrysomelidae, *e.g.*, Chrysomella, Haltica.
 „ 8.—Cerambycidae, *e.g.*, Phryneta, Cercoplesis.
 „ 9.—Curculionidae, *e.g.*, Calandra.
 „ 10.—Tenebrionidae, *e.g.*, Psammodes.

Order 5.—Lepidoptera.

Sub-Order 1.—Rhopalocera.

Family.—Papilionidae, *e.g.*, Papilio, Colias.

Sub-Order 2.—Heterocera.

- Family 1.—Saturniidae, *e.g.*, Atherea.
 „ 2.—Bombycidae, *e.g.*, Bombyx.
 „ 3.—Sphingidae, *e.g.*, Acherontia.
 „ 4.—Psychidae, *e.g.*, Animula.
 „ 5.—Noctuidae, *e.g.*, Heliothis.
 „ 6.—Pyralidae, *e.g.*, Galleria.
 „ 7.—Tortricidae, *e.g.*, Carpocapsa.
 „ 8.—Tineidae, *e.g.*, Gelechia.

Order 6.—Diptera.

- Family 1.—Cecidomyiidae, *e.g.*, Cecidomya.
- „ 2.—Culicidae, *e.g.*, Anopheles, Culex.
- „ 3.—Simuliidae, *e.g.*, Simulium.
- „ 4.—Tabanidae.
- „ 5.—Muscidae, *e.g.*, Musca, Ceratitis.
- „ 6.—Oestridae, *e.g.*, Gastrophilus, Hypoderma.
- „ 7.—Hippoboscidae, *e.g.*, Hippobosca.
- „ 8.—Pulicidae, *e.g.*, Pulex.

Order 7.—Hemiptera.

Sub-Order 1.—Heteroptera.

- Family 1.—Pentatomidae, *e.g.*, Antestia.
- „ 2.—Cimicidae, *e.g.*, Cimex.

Sub-Order 2.—Homoptera.

- Family 1.—Cercopidae, *e.g.*, Aphrophora.
- „ 2.—Cicadidae, *e.g.*, Cicada.
- „ 3.—Aphidae, *e.g.*, Aphis, Phylloxera.
- „ 4.—Coccidae, *e.g.*, Icerya.

Sub-Order 3.—Parasitica.

- Family 1.—Pediculidae, *e.g.*, Pediculus.

Class V.—Arachnida, or Scorpions, Spiders, Ticks, and Mites.

This third class of the Arthropoda is a rather miscellaneous group, but is marked off from the Crustacea, Insecta and other classes of Arthropoda by certain characters, or rather the absence of certain characters. Thus there are *no antennae*, the place of which is usually taken by pincer-like organs or chelicerae. Again, there are *no true jaws* or mandibles, the place of which is taken by a pair of appendages, the pedipalpi, which are not hard biting organs. Behind the appendages there are *four pairs of walking legs*. The segments of the body are variously arranged, but in most the head and thorax are fused into a cephalo-thorax, which carries the above-mentioned appendages. The abdomen is often separate, but sometimes fused to the cephalo-thorax.

The most obvious distinction between this class and that of the insects, which it sometimes resembles, is in the number of legs. Thus, though Scorpions and Spiders are usually distinct enough from insects, ticks and mites are sometimes erroneously called insects, as, for instance, the "Scab-Insect," which is a mite; these have, however, four pairs of legs, not three, as in the insects.

OPISTHOPHTHALMUS (Fig. 126, A), or PARABUTHUS, the Scorpion, is a type which can readily be procured in South Africa, and is a convenient one to represent the group. Scorpions are nocturnal in their habits, but may be found under stones or bark of trees, though many species of Opisthophthalmus live in deep burrows in the ground.

The body consists anteriorly of a small shield-like piece, the carapace covering the head and thorax or cephalo-thorax, to which are attached the appendages. Behind this region is the abdominal region, consisting of a thicker part or pre-abdomen of seven segments, and a thinner part, post-abdomen or tail, of five segments. Attached to the last segment is the sting, which looks like a sixth segment; it has a swollen part containing two poison glands and ends in a sharp point. Each of the segments of the pre-abdomen has a hard upper and under plate, joined to each other at

the side by soft skin, except in the seventh, where they run into each other. The segments of the tail are each enclosed in a complete hard ring. The three divisions of the body are sometimes called pro-mesa and meta-

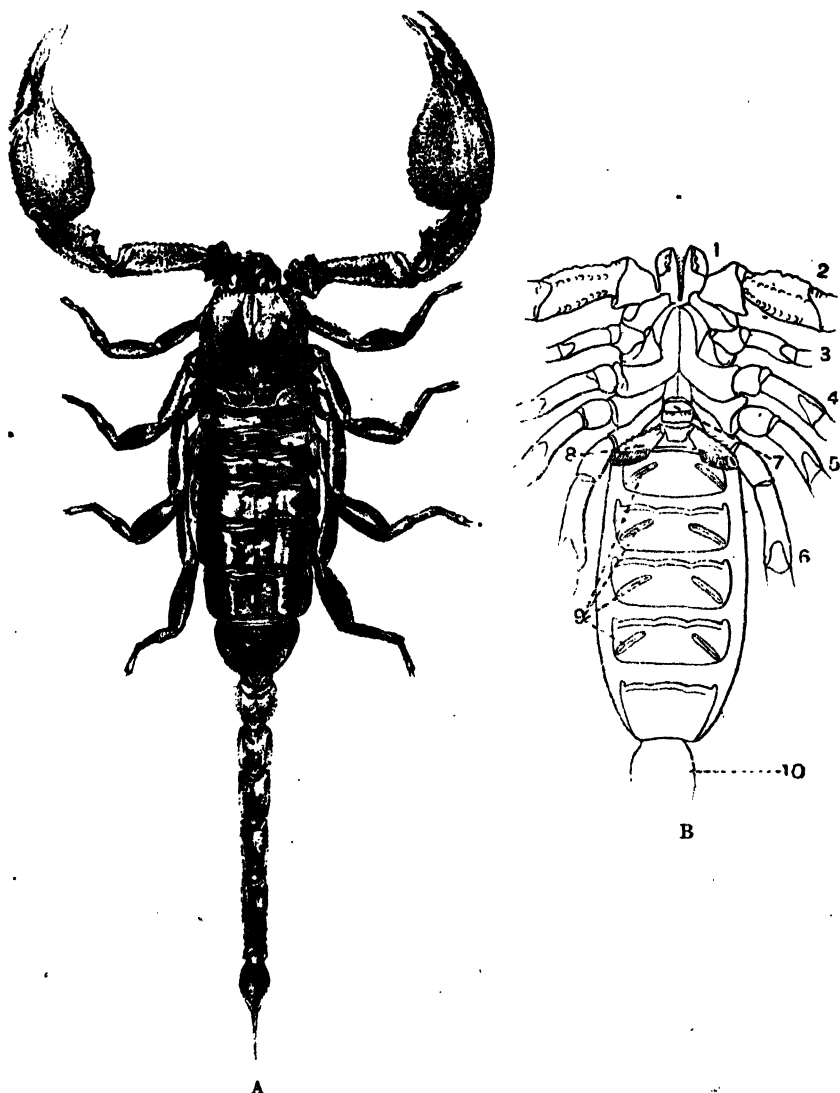


Fig. 126.—A, A Common South African Scorpion, *Opisthophthalmus karooensis*, natural size. (Parcell, from photo by Lighfoot). B, Ventral view of pre- and post-abdomen of *Buthus afer*; 1, chelicerae; 2, pedipalpi; 3-6, first to fourth pair of walking legs; 7, genital operculum; 8, pectines; 9, stigmata or openings to lung books; 10, first segment of post-abdomen or tail. (Shipley).

On each side of the mouth, which is small and covered by an upper lip or labium, there is a small jointed appendage, the chelicera, provided with pincers at its end (Fig. 126, B). They correspond to the antennae of the crawfish, but not of the cockroach. Following these there is a second

pair of appendages, the pedipalpi in the shape of a large six-jointed structure ending in pincer-like claws; these are supposed to correspond to the jaws of Crustacea and Insects, and, although they are chiefly useful as organs for seizing prey, they have at their bases jaw-like projections, which bite against each other and help to hold the prey while its juices are sucked out by means of the mouth. The third to the sixth pair of appendages are walking legs, each consisting of seven joints and ending in curved horny claws.

All these six pairs of appendages belong to the cephalo-thorax; the segments of the rest of the body or abdomen are apparently devoid of appendages, which may, however, be represented by certain structures. Thus, on the ventral side of the first abdominal segment, there is a plate, known as the genital operculum, as it has on its posterior aspect the genital pore; on the second there is a pair of peculiar comb-like organs or pectines, the function of which is not known; again, on the under side of the remaining segments of the pre-abdomen, there are pairs of slit-like openings or stigmata, which lead into breathing chambers, called lung-books, as they contain a series of flat, leaf-like projections, and there is reason to believe that parts at least of these lung-books (the floors) represent much modified appendages.

Three of the chief orders of the Arachnida are I. SCORPIONIDA or Scorpions, II. SOLIFUGÆ or False-spiders, III. ARANEIDA or Spiders, IV. ACARINA or Mites and Ticks, and V. XIPHOSURA or King Crabs, Arachnids of a primitive aquatic, water-breathing type.

Order I.—Scorpionida or Scorpions.

This order is characterised by the long segmented abdomen, divided into two parts, a pre- and post-abdomen. It is well represented in South Africa, though of the six families of this order, only two, the Buthidae and Scorpionidae are present. Of the first, PARABUTHUS, a genus including the large forms with thick tails, is found over the whole of South Africa, where it almost entirely replaces the genus Buthus of other countries. It is supposed to be poisonous, and cases of fatal results following its sting are said to be known. OPISTHOPHTHALMUS already mentioned, may be recognised by the position of the median pair of eyes behind the centre of the cephalo-thorax. This genus includes the largest and most characteristic Scorpions of South Africa. They usually live in deep burrows in the ground, but OPISTHOPHTHALMUS KAROOENSIS (Fig. 126, A), lives in shallow excavations under stones. They can produce a hissing noise by rubbing the chelicerae against the thorax. Their sting does not appear to be fatal (Purcell).

Order II.—Solifugae or False-Spiders.

In these the head, thorax, and abdomen (of three segments) are distinct from each other. The order is better represented in South Africa than in any other part of the world, though Galiodes, a well-known genus, is absent. Species of SOLIFUGA, an exclusively African genus, are well known throughout the country districts; they are large, sometimes over 6½ centimetres in length, yellow and black in colour; they often enter houses at night, causing considerable alarm, though they are quite harmless. They are credited with the habit of cutting off the hair of sleeping persons at night and for this reason are known as Haarscheeders or Hair Cutters. This idea was probably suggested by the greatly developed chelicerae, which are of use for catching insects on which they feed. A Mashonaland species, SOLIFUGA SERICEA, feed on termites (Pocock). Another and more appropriate local name is Jagd-spinnekoppen or Hunting-Spiders. They are also called Romans.

Order III.—Araneida or Spiders.

This order may be distinguished from others by the fact that the abdomen is unsegmented, and usually soft, rounded and attached to the cephalo-thorax by a narrow neck. The chelicerae have poison glands and

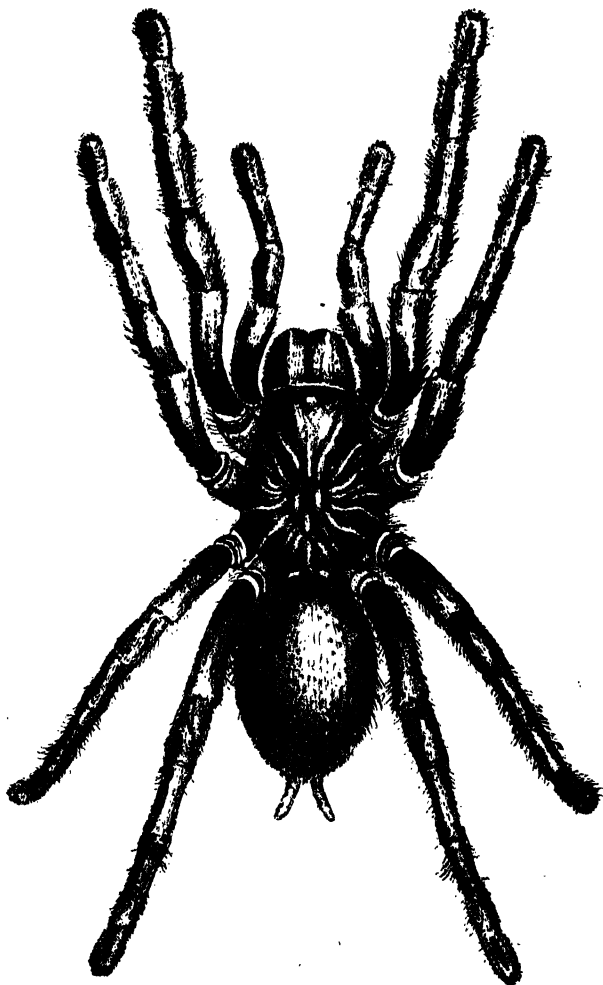


Fig. 127.—A Baviaan Spider, *Ceratogyrus darlingi*, which is found in Rhodesia, Bechuanaland and the Transvaal. (Pocock, P.Z.S., 1897).

the pedipalpi are leg-like. On the abdomen are certain appendages which have been modified into spinning glands; some of these provide the fine thread of which the web is made; others the sticky material which occurs at intervals like beads on the thread of the web. Insects are caught by these sticky globules, which the spider itself can readily avoid in walking about its web.

HARPACTIRA, or *Ceratogyrus* (Fig. 127), the Baviaan-Spinnekop, Baboon-Spider, or Baviaan-Spider, also sometimes called *Tarantula* (a European Spider), is a large hairy form of formidable appearance, being sometimes over two inches in length. Some of these are popularly

credited with being able to catch small birds, and are sometimes called 'Bird-catching Spiders, like certain large spiders in South America which are known to catch Humming-Birds. *Harpactira* lives in deep burrows in the ground, the entrances to which are protected by turrets of sticks. Other allied genera make very perfect trap-doors to close up their abodes, and smaller forms, which construct sac-like nests in trees, have one or two such doors.

There are not many social spiders but one, *STEGODYPHUS*, is found all over South Africa. Several hundreds of them may inhabit a nest made of leaves spun together and anchored by strong threads in or between bushes. There are very few spiders which live in the sea but one, *DÆSIS*, is frequently found under stones between tidemarks. Jumping Spiders (*Attidae*) are common in South Africa.

Order IV.—Acarina or Mites and Ticks.

In this order the head, thorax and abdomen are not divided from each other, and there is, with one exception, no trace of segmentation. The mouth parts are adapted for sucking, but frequently capable of biting and piercing. The chelicerae are clawed or chelate, or may form piercing stylets, protected by a sheath, formed of the base of the pedipalpi. They are an important group economically, as they produce sheep-scab, mange, itch, galls in plants, and are important agents in the conveying of serious diseases.

Family I.—Trombididae or Harvest-Mites.

TETRARYNCHUS, the "Red Spider," is a mite which causes damage to plants by sucking the sap or blocking up the pores of leaves by its webbing and excreta. It is not a spider, from which it can be distinguished by its rounded body, not separated into parts. It is a small, brightly-coloured animal, and may usually be detected by its webs, in which whole colonies live under leaves. The animal itself is so minute that it can hardly be seen with the naked eye. In South Africa it infests chiefly the Cape Gooseberry (*Physalis peruviana*), and prevents extensive cultivation of this plant in the South-Western districts. *BRYOBIA PRATENSIS*, an allied mite, does considerable damage in some seasons to pear and plum trees in a number of inland valleys.

Family II.—Sarcoptidae or Scab-"Insects," etc.

These are mites which are parasitic on animals, including man. They are small, with a rounded oval body, from a millimetre (1-25th inch) to a tenth of this in length, so that they may be almost microscopic. They cause various diseases known as scabies or psoric diseases, such as mange, itch, sheep scab, etc.

There are three kinds of mites which produce scab in sheep.

PSOROPTES COMMUNIS, variety *OVIS*, is the commonest form. It is one which can be seen with the naked eye, and is to be found under the scabs, which are formed on the skin as a result of its work. The female has a large round body, and, of the four pairs of legs, the first, second, and fourth are provided with suckers at their ends; the third has two long thread-like appendages; the third and fourth pair are of about equal length. In the male the fourth is much smaller than the third, which has sucker and a long thread-like appendage. (Fig. 128.)

Life History of the Common Sheep Scab-Mite.

The eggs are laid by the female at the edge of the scabs, and are relatively large, being visible as minute glistening white specks, oval in outline. Their presence may be taken as evidence of the disease, even when the mite is not to be seen. They may hatch out in about five to eight days, the time varying with the temperature. Dipping has little effect on the unhatched eggs, hence the necessity of a second dipping, within ten to twelve days after the first. Only one egg is produced per day, and not many (about 15) in all, but reproduction takes place at an early stage, when about fifteen days old, and it has been calculated (Gerlach) that in one month a single pair will have given rise to 1,500,000 descendants. The young (larvae) are much narrower than the adult, and have only six legs like insects, the fourth pair not appearing until later. They moult three times before reaching the adult age. The young mite begins to burrow in the skin, but never goes deeper than the outer skin or cutis. After a time a small swelling or vesicle appears at the place where

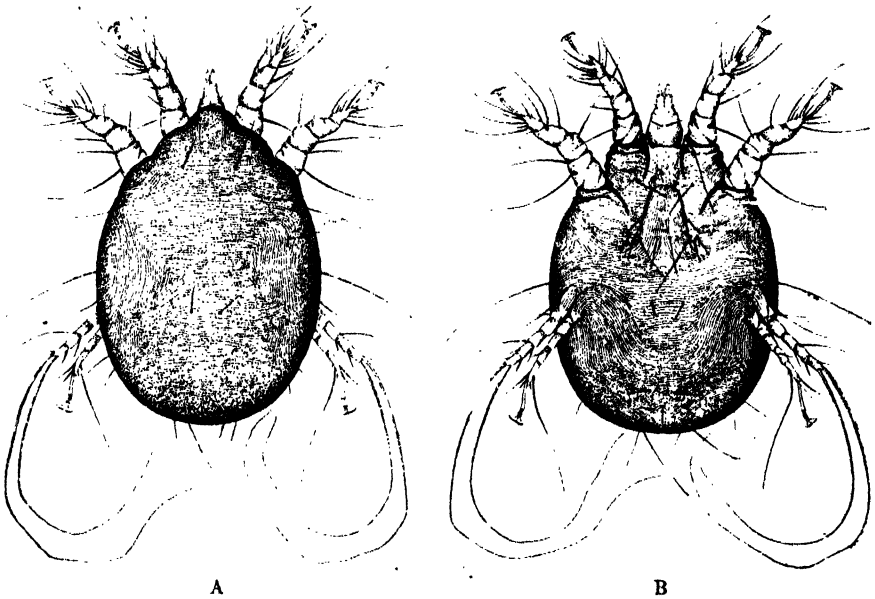


Fig. 128.—The Common Sheep Scab-Mite, *Psoroptes communis* variety *ovis*. Female. A, dorsal, and B, ventral view. (U.S.A. Dep. Agr.)

it has entered, and a yellowish substance is exuded, which, on exposure to the air, hardens and forms the scab, underneath which the mites live and increase. The scab is usually noted about sixteen days after entry. The irritation set up in the skin causes the sheep to rub itself against various objects, and the wool and scab being readily detached, may come in contact with other sheep and the disease thus spreads from one flock to another. The only real remedy is dipping to kill the mites, and if this is thoroughly carried out the disease completely disappears, and cannot reappear again, except by infection from other diseased sheep, for it is to be noted that the parasite, unlike that of some other diseases, has only the one host. It will be readily understood that a poor condition of the sheep cannot of itself give rise to scab, as is sometimes supposed. Not only is this mite confined to sheep, but usually to certain parts of the animal. Thus it is seldom found on the head, legs, breast, or belly of the sheep, but chiefly on the more woolly parts.

SARCOPTES is another genus of mite which attacks sheep. **SARCOPTES SCABEI**, variety **OVIS**, produces head scab in the sheep. It usually attacks parts not well provided with wool, such as round the eyes, ears, nostrils, or lips, though it may spread to the legs and belly. The mite is round and white, with numerous spines of two sizes on the dorsal surface, and with two pairs of anal bristles. The legs are short; the first two and the fourth pairs have suckers; the third pair in the male and the third and fourth in the female have long spines. This mite, unlike **Psoroptes**, which only pierces the epidermis, makes tunnels in the dermis or true skin, where it lays its eggs, producing a hard thick scab and wrinkled skin. This is the kind of scab that is most frequently found in the Boer-Goat in South Africa. **SARCOPTES BOVIS** is found on calves in South Africa, and **S. SUI** on the pig. Other varieties infect horses, dogs, and cats.

SYMBIOTIS is a third genus of this family. It lives in colonies, congregating in localised patches, which spread very slowly. It may be distinguished from **Psoroptes** by the fact that the legs are longer and more prominent, but it resembles it in living under the scab and not burrowing in the true skin like **Sarcoptes**. **SYMBIOTIS CAPRAE** is the scab mite which attacks the Angora Goat.

DEMODEX is another scab-mite, belonging, however, to another family; it is found in the hair follicles and sebaceous glands of man and domesticated animals. It is known as red-mange in dogs, and appears at first as red patches round the eyes spreading subsequently to the body.

(To be continued.)

IMPROVING MERINO FLOCKS BY SELECTION.

By W. M. McKEE, Government Wool Expert.

The prosperity of the farming industry depends to a great extent upon the improvements or otherwise which the flocks make during the year, and improvement cannot take place unless the work of selection and rejection is properly carried out in a systematic thorough manner. Selection can be carried out by both large and small farmers with great benefit to themselves and the sheep industry.

When starting, study your farm and its environments, also decide on your capability for picking good sheep, if you are not a good judge get the help of a reliable man to choose a few of the best ewes of the type of sheep you decide suits your farm best, and resolve to make it a life study if you wish to obtain the greatest success. One important point is that your foundation should be of a pure type if you wish to succeed permanently and uniformly, and this applies especially to first-class stock. Our farmers are awakening slowly but surely to a keener sense of the demand and necessity for a pure type, and for a better class of sheep and wool. So that it is only a matter of time and expense for every flockmaster to realise that the adoption of a pure type Merino is the only sure course to follow. We have so many pure types now founded from which to select that the cultivation of others is not needed. Even if the farmer wants to do so, it means years of patient toil and great loss of time, and many disappointments before he can hope to fix the type so that it can be relied on to throw true. Cross-bred sheep are useful for specific purposes but are not suitable as breeders.

In improving our flocks by selection, we not only elevate the name of our Colony in the estimation of the world, but we educate ourselves to a higher appreciation of things that tend to make progress, and therefore we ourselves obtain greater pleasure from our work, as well as greater profit.

The most energetic and up-to-date farmers that we have to-day in the sheep industry are men who love the work for the work's sake, who have started with fair stock and a definite object in view.

Selection, or in other words, the choosing of the best ewes and rams to breed from is one of the most important subjects in sheep farming. As many as possible of the good characteristics found in the ram should be sought for in the ewe. Generally speaking, a ram should be chosen with a massive, powerful front, but the ewe for breeding purposes is generally chosen with heavier hindquarters. Many breeders favour the short-legged sheep, while others prefer the long-legged, but I think this is not of vital importance, and that, as a fact, a good medium length is best. It is recognised by breeders that the ewe generally gives the size to the progeny and the ram the form, as is shown in the crossing of the merino ewe with an English ram.

The most favourable time for going through your sheep to class and cull, is when they are about two years old or over, as then all those ewes which have never borne lambs could be picked out and marked with a special brand to see if they bear lambs the following year. If these ewes do not, but continue barren for several years, it is then useless keeping them in your breeding flock, and unless they carry a very heavy and valuable fleece it would be better to get rid of them.

Breeding ewes should have a good set of teeth, so that they can gather and masticate their food properly. Reject any that suffer from deformity, incurable disease, or a ewe that disowns her first and second lamb. It is better, I hold, to have 20 good lambs than 25 in which five are inferior, as these five sheep that have defects generally stand out very prominently in the flock when under inspection, giving the whole flock a neglected appearance. These sheep, if allowed to pass the selection tests, will transmit their defects year after year and increase the number of undesirable sheep, which take the same amount of care and attention as the best.

A successful breeder must be a good judge of the breed he handles, and to become a good judge it is necessary that he should study that animal until he thoroughly understands it. In some cases, owing to being bigoted, those who have had a life-long experience with a certain breed or type, are sometimes not good judges of other types or breeds; they may lack intuition, or be prejudiced in its favour or otherwise.

Often on my visiting different farms and being shown the sheep in the kraals, my attention has been drawn invariably by the farmer to the fine-looking, dense-woolled, and fine constitution of a few sheep, which he picks out in high glee; whilst in a depreciative manner he regrets the presence of numerous other sheep which have not got these good points, but are very far behind in every respect. Now this should not be, as when we can grow a hundred good ewes there is no reason why all the flock should not be the same, or very near it; the difference in these sheep being most marked.

To the eye of an amateur "a sheep is a sheep," but as all breeders know, there is a vast difference between ewes in every flock. I have seen in one flock sheep give a return of 3s. per head for wool and 12s. for carcass, and another give a return of 10s. per head for wool and 20s. for carcass, both same age and under same conditions; it is this point which the practised eye can at once detect, thereby enhancing in selection not only the income of the farmer concerned, but the return to the Colony as a whole. Now to remedy this state of affairs it would be necessary for the farmer to keep separate two or three flocks during the mating season. Into the first grade flock are put all the most perfect sheep that are to be obtained, or as near perfect as possible. In doing this the best sheep should be first picked out, and not as is generally the custom, go to a kraal and point out to a native what is considered the most defective sheep, and have them dragged out of the yard by the leg. This is a very slipshod manner of doing the work, and generally results, as may be expected, in a great many inferior sheep being left behind in the supposed good flock, which have no right to be there. It is a much better plan to go into the yard, if you have not the proper drafting yards, and pick out a few of the best sheep as a standard to work up to, and then continue picking after careful handling, all the sheep which most closely resemble the best. In doing this a third flock would in all probability be made where all the very inferior, weedy, and defective sheep could be placed. Constitution and symmetry is the main foundation on which to work, and without this foundation it will be found a hopeless task to try and improve the wool-carrying capacity on the sheep. Now, no matter how pleasing to the eye

the wool on the sheep may be, should a sheep be without constitution it should be removed from the breeding flock. The proper time for going through the ewes would be just before shearing, when the wool is long, then one can see at a glance the covering on each individual sheep, and a special mark could then be placed on the nose, ears, or legs of the sheep, where the marks could not rub off during the process of shearing. Further, when the fleece is off, it should be minutely examined, and notes taken, to see where improvement could be made in the progeny.

In Australia and America a great many of the squatters or farmers do not select or class their own flocks of sheep, but call in a professional sheep classer, who has a standard form in his mind's eye, which he knows from experience that all sheep should approach as near as possible before passing into the selected flock. It is only through long practice, close observation, knowledge of the best type of sheep, and fearless criticism that the selection can be carried out to perfection and any benefit derived therefrom. It is advisable, I think, for a farmer to call in now and again an outside man—one who will give his honest judgment and who thoroughly understands the art of selection, and sheep breeding and mating, as the breeder after some years becomes so accustomed to his sheep, that very often he fails to see defects in them, which would be most apparent to an outsider, who could give his opinion in regard to all the faults which he may detect. Probably the criticism would not be very favourable to the farmer's flock, but honest criticism would do much to improve the flocks in the Colony and encourage the elimination of those faults.

I have classed over 50,000 ewes in South Africa for different farmers, ranging from a flock of 400 up to 2,000 ewes, and as a rule have noticed how a farmer fails very often to notice the defects in his own sheep, although he can at once detect them in others.

A sheep classer knows how to turn the best class of sheep to the best possible account in laying the foundation of uniformity of the breed, which is so desirable, and in counteracting the general mixture of types which is so prevalent in our flocks to-day with, I am sorry to say, a very few exceptions. I will now outline the method I generally adopt in selecting ewes on the average South African farm.

In selecting ewes from the ordinary flock, and where the drafting yards permit of it, draft all the ewes of the same age into their respective lots, *i.e.*, 2 tooth, 4, 6, 8 tooth, and broken mouth. If this is done it greatly simplifies the work, and if not practicable, then you must bear in mind the age of the sheep during your examinations, and in making your final decision the old sheep must have allowances made, as perhaps there is less body in the wool than in a younger sheep.

Now suppose we have all the ewes in the yard, then first of all look through them until you see a sheep which stands well above all others in size, constitution, condition, and covering of wool; take her out and put on one side. Next pick out the worst looking animal you see, and put her on one side; then pick out a medium looking ewe between these two extremes; now go thoroughly and carefully over every point of these three sheep so that they are stamped well on your memory.

Then start to work slowly and carefully. Speed will come when you get the hang of it, and don't try to force a ewe up to a higher grade when she is not worthy of it; better keep her down if you are not certain. Have for the first grade all the cream of your flock, and the line of demarcation well established between the grades. Work systematically, and always take the same points in rotation. Have a good light, but not the sun's rays shining on the wool direct; have shade, keep dust down by watering, and don't talk or look about in the middle of examining a sheep; finish it first; make up your mind where it is to go *at once*, and put it

there. If doubtful, then look at it later on, but don't hesitate; first impressions are generally the best; have your marking paint handy and mark as follows: On the nose first grade, right ear second grade, left ear third grade, unmarked, too bad to keep. Have every ewe brought to you and see that it is standing as natural as possible, perfectly upright, straight in body line, with head not too high or too low. Always examine a sheep standing up in its natural position, and do not let it lie down, as this gives a false impression of density in the wool. To examine underneath wool place the ewe on its rump and let it sit straight up between the holder's legs with the fore feet held up out of the way. I have not found it necessary to turn up flock sheep very often, as I look from the side, and generally find the same signs, *i.e.*, weak bellies, due to being pulled out by bushes, etc., and other causes, as breed, etc. Now the first point to examine in a sheep is the mouth. See that it has its teeth properly placed on the pad of the upper jaw, neither protruding over it, nor being placed far behind; both are very bad faults, and sheep showing this defect badly should be at once passed out for sale or butcher, and on no account be bred from. I have noticed the teeth undershot 1 to 1½ in. in some cases over 30 per cent. of the flock. The overshot is not so common, but equally objectionable. The lips must be opened to see this, and do not judge by the outside appearance of the jaw as so many do. Artificial feeding may cause the teeth to come forward in rare cases, but that will not alter the aspect of the pads. Old sheep may show overshot a little on the teeth. A good full round mouth with strong teeth is preferable to a pointed mouth with thin teeth; the colour of the teeth vary as to the pasturage they are on. Karoo sheep in certain seasons have very black teeth, whilst grass fed sheep have nearly always white, but this is not an important point. Black spots in the mouth should not cast the ewe, as long as we don't get black spots on the wool; it is better to be without black spots, but they are not very important. After examining the mouth and teeth to see they are alright, next turn to the nostrils, which should be large and open, to allow the free circulation of air to the lungs, this is especially wanting in some of our sheep, so many have very small, flat openings, causing the sheep distress in breathing, especially in hot or dusty weather, and they soon get blocked up with dust, which causes a mucous discharge.

Now we come to the frame, carcass and constitution. The neck should be full and well set on the body, the withers broad and full, the ribs round and well sprung, the rump broad and well set up. Then look to depth of body down the fore leg, then width of chest and bone in the leg; if all these are developed as they should be, then turn to the wool covering and start on the wither by opening it gently but firmly like opening an umbrella, then open on centre of back, then rump, then go down to the shoulder midway down the sheep's body right over the fore leg, then just behind the shoulder to see if the devil's grip is present, then on the ribs or side midway between fore or hind legs, then flank and on the points of the fore arm and britch, then underneath; each time the wool is opened on these different points you look first for density, that is the greatest number of wool fibres to the square inch, this is seen by gently opening the wool with a light and even pressure and judging by the amount of skin to be seen. If one-sixteenth inch of skin is seen then it is fairly dense, if one-eighth inch not so good, and if more than one-eighth inch skin then the wool is rather open or not dense. After density comes length which at twelve months should be at least 2½ inches or upwards, but not shorter; then conditions or amount of yolk present, colour, crimp, freeness in growth, softness and silkiness. Each time the wool is opened on these different points, you must remember each of the above characteristics, and in addition compare them over the whole covering of

the ewe for uniformity in the different parts. We don't want beautiful wool on the shoulder and hair on the britch, which coarseness deteriorates the value of the whole. If once these points are ground in on one's memory and an ideal formed, then we will be able to obtain the uniformity so much desired.

All the sheep having the best points would be now in the first grade flock, and should be uniform, of good constitution, and carrying a good commercial wool, and about twice the value of the third grade flock. During this work you may have formed two, three or four grades from the flock, the first grade containing all the best sheep as near perfection as possible. The second flock would be the sheep slightly inferior to the first, and the third a little lower still. The remaining flock should contain all sheep with blemishes or any other defect or malformation to fatten if possible and sell to the butcher. As the years go on the second and third flock will gradually disappear, as they will be the ones to make room for better sheep, and every succeeding year the first grade flock will gradually grow larger and increase. The first flock will now give the farmer a higher standard to work upon, which is constantly raised by culling heavily and selecting the best ewes to put to the best rams, and those which do not come up to a uniform standard can be removed to the second or third grade.

A large sized sheep is very useful to the farmer, provided it has quality and character as well. It is undoubtedly more valuable than a small one, if it has a certain amount of good wool on its back. It is in the medium sized sheep that quality of the highest average is found, but big bodies and the highest class of wool seldom go together.

I have often been asked whether a breeder could obtain rams suited to his flock out of his own flock, and in looking over the flock I came to the conclusion that with careful selection he could improve his flock out of all recognition by judicious and careful selection, but this system of in-breeding in the hands of a careless or ignorant man would spell ruin for him.

CO-OPERATIVE EXPERIMENTS—CEREALS.

Further reports have come to hand in connection with co-operative experiments which the Agricultural Department is carrying on in conjunction with the farmers in the Cape Colony. While some of these are still lacking in detail and others savour of indifference, the majority are of a very satisfactory and instructive nature, and show an encouraging improvement, which points to the fact that the farmers are beginning to realise the importance of these experiments and the beneficial results which will accrue from them if the required amount of interest is forthcoming.

GLUYAS WHEAT.

The 1908 reports show that Gluyas wheat is one of the best of recent introductions, and its virtues include quality, yield and rust-resistance. Of the 24 reports received in that year only two mention rust. In 1909, although it is still rapidly gaining in favour and many of the reports are of a very flattering nature and eulogise its rust-resisting and yielding properties, a good many report rust, which, however, in nearly every case can be traced to "late" sowing, and it is also possible that the seed may not be true in all cases. Up to date 40 reports have come to hand from the 1909 season. Twenty-four of these show good results, one indifferent and 15 failures through rust, birds, locusts and drought.

REPORTS FOR 1906-8.

Malmesbury.—Mr. L. de Jongh, Darling. Sown June 15th, 1906. Result : Good. The best wheat for the Darling district. Will most certainly pay.

Messrs. Kahn & Levin. Sown May 12th, 1907. Result : Good. Suitable and will pay. From 20 lbs. seed sown, $5\frac{1}{2}$ bushels obtained. The year being very dry, other wheats did not yield half this quantity. Given a good year will do still better.

Mr. John Steyn, Klipheuvcl. Sown end of May. Result : Excellent. I consider this the best wheat of all. Sown broadcast and thinly on unirrigated land. Reaped end of November. Yield 23½-1.

Mr. L. C. J. Smith. Sown 27th May, 1906. Result : Indifferent. Sown thinly by hand. Reaped 20th October, 1906. Yield 21½-1.

Wellington.—Mr. P. J. D. Wessels. Sown 15th May. Result : Indifferent. Is suitable for district if rust-resisting. Reaped in November. Yield 5-1. Think of giving it another trial.

Tulbagh.—Messrs. du Plessis & Schoch. Sown 28th June, 1906. Result : Good. Sown broadcast and thinly on unirrigated land. Reaped December, 1906. Yield 13½-1. Suitable and will pay in this district. Stands drought well and need not be cut till quite ripe as it does not shed its grain. Can strongly recommend it, and intend going in for it on a large scale.

Piquetberg.—Mr. J. H. L. Dale. Sown May, 1906, and May, 1907. Result : Good. From 20 lbs. sown in 1906, reaped 320 lbs. From 200 lbs. sown in 1907, obtained 840 lbs. Both years very dry. This is the best wheat tried so far, and there could be no better for such dry parts as the Karoo here. The earliest, best drought-resisting, and no trace of rust could be discovered. The quantities reaped work out at about 16 to 1 in a dry season, as compared with other kinds, such as local "Een Been," which gave a return of 7-1.

Paarl.—Mr. W. Pretorius. Sown June, 1906. Result : Good. Suited to the district and will pay. From 2 bushels sown obtained 9 bags, which, considering the very dry season, was very good. Not attacked by any disease.

Paarl.—Mr. H. Theunissen. Sown May 20th, 1907. Result: Good. This wheat has been tried in the district for two years, and although it takes rust in the straw is not affected in the ear. Fast grower, second earliest in this district. Wheat white, gives fine meal and makes bread nice and loose. Would recommend farmers not to sow before the end of May or beginning of June, sowing thickly. This kind is going to be the wheat of South Africa.

Caledon.—Mr. P. K. Hoffman. Result: Good. A good wheat for district. Yield could not be estimated as it was beaten down by rain. Slightly attacked by rust.

Mr. J. S. le Sueur. Sown 24th May, 1906. Result: Excellent. Sown broadcast and thinly on unirrigated soil. This wheat matures early and was harvested in November. Yield excellent considering the very adverse season, 14—1. Showed slight specks of rust in leaves only.

Swellendam. Mr. Donald Moodie. Sown 5th June. Result: Good. Is suitable for this district and will pay if sown early, say early May. Rust seldom appears here before November. Attacked by rust in stalk just before ripening, but the grain was not injured. Reaped in November. Yield 12½—1.

Robertson.—Mr. J. J. Hill. Doubtful as to whether this would pay, as when nearly ripe corn was attacked by rust. Sown on unirrigated, rich soil. Perhaps if sown on poorer soil no rust would attack it. Rietti was sown next to it and had no rust.

Uniondale.—Mr. J. H. Kritzing. Sown 19th June, 1906. Result: Good. Sown broadcast and thinly on irrigated land. Reaped 10th January, 1907. Yield 5—1. Too much rain immediately after sowing, which did a great deal of harm. I consider it will do well here, and am going to continue sowing same.

Lower Albany.—Mr. A. H. Robey. Sown 15th June. Result: Indifferent. Sown broadcast and thinly on unirrigated soil. Reaped 6th December, 1906. Yield 3—1. Suitable and I think it will pay in this district. Am trying it again this year.

Bedford.—Mr. A. V. C. Shone. Sown 9th June, 1906. Result: Fair. Yield 500 lbs. from 20 sown. I do not think this wheat will pay, nor does it seem very suitable to this part; attacked by rust, but not badly. This wheat, in spite of irrigation, could not withstand drought, but will sow again to give it a fair trial.

Dohne.—Mr. T. C. Fynn. No date given. Germinated well, but killed by drought.

King William's Town.—Mr. C. E. Dell. Sown June, 1906. Result: Indifferent. Reaped 20 lbs. from 12 lbs. of seed. Might have done better had the season been less dry or irrigation carried out. Not attacked by any disease.

Tarkastad.—Mr. H. C. van Heerden. Sown 5th July, 1906. Result: Good. Sown broadcast and thinly on irrigated land. Reaped 27th December, 1906. Yield 8—1. I can recommend this wheat for this district.

Middelburg.—Mr. R. H. Douglas. No date given. Result: Fair. Sown broadcast on irrigated land. Reaped 15th January, 1907. No rust, but crop very thin. It is a good wheat, but not rust-proof, and the stalk seems weak. I also sowed some on unirrigated land. Reaped 20th January, 1907. Attacked by rust about three weeks before it ripened. Also attacked by locusts.

Rosemead.—Mr. W. E. Collett. Sown 29th May, 1906. Result: Poor. Sown broadcast and thinly on irrigated land. Reaped 21st January, 1907. Yield 15 5/6—1. A poor yield, but grain and straw good. Slightly attacked by rust. I do not consider this variety suited to this district.

Barkly East.—Mr. Claude Orpen. Sown 12th July, 1906. Result: Fair. This is about the least suitable of the wheats tried; it hardly had a fair test and withstood drought and rust. Yields 30 lbs. from 12 lbs. owing to damage done by poultry.

Richmond.—Mr. J. G. Hauptfleisch. Sown 15th August, 1906. Result: Poor. I do not think it suitable nor will it pay in this part. Slightly affected by rust in December. Could not judge the yield as, being a beardless variety, birds did considerable damage.

REPORTS FOR 1909.

Worcester.—Mr. D. S. Botha. Sown 12th June, 1909. Result: Good. Sown thinly, rather late, on clayey soil, unirrigated and unworked land. Wet during the latter half of winter. Was not attacked by any disease. Rust was prevalent throughout the whole district. Darling and other kinds of wheat have been entirely destroyed and, as far as I have ascertained, the Early Gluyas was the best rust-resisting variety this season. Reaped 12 to 1 lbs. on the 20th November, 1909. 20 lbs. guano was applied.

Tembuland.—Mr. P. C. le Roux. Sown 5th June, 1909. Result: Good. Sown thinly on unirrigated land well ploughed and harrowed. No manure was applied. Sowing was very early for district. Reaped 15 lbs. from 1 lb. on 15th December, 1909. Severe drought during spring, except during the last two weeks in December. I certainly think it will pay, and should be sown last week in June or first week in July, for, being an early wheat, it is liable to be destroyed by frost.

Bredasdorp.—Ohlsson's Potteberg Farms. Sown August. Result: Good. Owing to extreme drought wheat was only sown in August and had no rain during growth. I consider it an excellent wheat, but the drought was abnormal. I reaped about 7 to 1, which, under the circumstances, I consider splendid. I will sow again this season. There was no sign of rust.

Beaufort West.—Mr. I. van Tuileken. Sown 23rd May, 1908. Result: Good. Sown thinly on irrigated land, light clayey soil. Reaped 31 to 1 on the 16th December, 1909. Normal weather, no rain. I find the wheat a fairly good yielder and expect a heavier yield when more acclimatised. It compares favourably with "Ou Baard." I consider it will pay.

Cathart.—Mrs. T. F. Miller. Sown June 12th, 1909. Result: Failure. Sown on irrigated land rather thickly. Cultivated, harrowed and rolled ground and irrigated once. Reaped 32—1 on January 1st, 1910. Had snow twice and also four inches of rain during growth. The wheat does not stool well and as soon as it begins to ripen it is inclined to fall out. I consider it will not pay and is not suitable to the district.

Durbanville.—Mr. H. Theunissen, Junr. Sown 1st June, 1909. Result: Good. Sown early thickly, unirrigated land, clay and gravel soil, no treatment. Weather very dry in beginning, good towards end. Reaped November 17th, 1909. Yield 20 to 1. No disease or insects. 40 lbs. guano used. This wheat is the fastest grower of all wheats and the best yielder, and good for milling and makes fine bread. I consider it should not be sown before the 15th May, rather later. It is the best wheat for this district and will pay.

Komgha.—Mr. W. A. Edmunds. Sown 3rd June, 1909. Result: Good. Birds attacked the wheat to such an extent that I had to reap before it was ripe. I consider it to be excellent wheat and a very rapid grower, although I must mention that this is not a wheat area. Mealies are more adapted to this part of the country. In spite of weather being very dry during growth it grew splendidly.

Malmesbury.—Mr. Alwyn Carstens. Sown 15th May, 1909. Result: Good. Reaped 1 bushel. I consider it suitable for district and will pay.

Tulbagh.—Mr. E. J. M. Schrenk. Sown 14th June, 1909. Result: Failure. Sown late, thinly, unirrigated land, gravelly, loose soil. Applied 50 lbs. superphosphates and 50 lbs. basic slag. Attacked by rust when coming into ear. Did not reap; no yield. I consider it suitable if not attacked by rust.

Eende Kuil.—Mr. I. J. van Zyl. Sown 15th April. Result: Good. Sown in due time, thinly, unirrigated land, sandy, lime soil, no treatment prior to sowing and no manure applied. Very little rain. Violent wind storms prevalent during growth, which greatly affected yield. Suitable for district and will pay.

Humansdorp.—Mr. James Young. Sown 22nd May, 1909. Result: Good. Sown early, thinly, irrigated three times, red soil, harrowed once. Applied kraal manure. Reaped 8th November, 1909. Yield 40 to 1. Birds very troublesome. Slight rust on straw, but did no harm to ears. Suitable for district and will pay.

Oudtshoorn.—Mr. W. J. Northcott. Sown 23rd July, 1909. Result: Good. Sown two months too late. Reaped 29th December, 1909. Yield 118 lbs. I consider this would prove a first-class wheat if sown earlier. It grows well and strongly.

Aliwal North.—Mr. A. W. Higgins, Curator. Sown 23rd July, 1909. Result: Good. Sown, irrigated three times, dark loam soil. Reaped 26th November, 1909. Yield 12½ to 1. Birds were very troublesome. I wetted the seed and coated same with lime before sowing. Suitable and will pay. Will sow earlier next time.

Graaff-Reinet.—Mr. G. B. Smith, Highlands. Sown July, 1909. Result: Failure. Sown late, thinly, black vlei soil, ploughed and harrowed. It was destroyed by birds. Under the circumstances I cannot give an opinion as to its being suitable, etc.

Fraserburg.—Mr. N. F. Hodgson, Williston. Sown 5th July, 1909. Result: Failure. Sown late. It ripened after my other crops had already been harvested, and consequently the birds were very troublesome on the small patch. It seems to be mixed wheat, as I noticed two distinct kinds, one beardless and the other not.

Grigoland East.—Mr. E. W. Lello. Sown 21st July, 1909. Result: Good. Sown on unirrigated land, rich, black soil, harrowed twice after sowing. Reaped on the 4th January, 1910. Birds did considerable damage. No disease or insects. I consider suitable for district and will pay very well. I will sow again this season.

Hopefield.—Mr. S. S. Walters. Sown 18th June, 1909. Result: Good. Sown in due time, thinly on irrigated, dusty, sandy soil mixed with clay, cultivated once, ploughed and harrowed. Reaped 15th November, 1909. Yield 26 to 1. Weather dry till August and part September; otherwise favourable. Yellowish rust, chiefly in blades on 15th August. 16 bags ordinary kraal manure applied. I consider it ought not to be sown till 1st June. Intend sowing 15 muids this season.

Elliot.—Mr. J. E. Marillier. Sown 27th May, 1909. Result: Failure. Failure owing to drought.

Mr. Spencer Davis (Messrs. Davis Bros.), Sown 21st June, 1909. Result: Indifferent. Sown late. No treatment after sowing and no manure applied. Reaped 24th December, 1909. Yield 4½ to 1. Weather very dry during growth. It is suitable for a late crop and will pay with decent rains.

Mr. R. H. Harding. Sown 3rd June, 1909. Result: Good. Sowed late; dark soil; no treatment. Reaped 18th December, 1909. Yield 20 to 1. Weather very dry. This is one of the best wheats I have ever known. It stands drought as well as any kind I know of. The straw is strong and does not take rust.

Swellendam.—Mr. C. J. Human. Sown 15th June, 1909. Result: Good. Sown thinly on unirrigated, rich soil; no treatment after sowing. Weather very dry during growth. Reaped on the 20th December, 1909. Yield 12 to 1. No insects or rust attacked it. I consider it suitable for this district and will pay.

Mr. H. O. Ekstein. Sown July 20th, 1909. Result: Failure. Sown thinly on unirrigated land; soil was broken up one year before and re-ploughed on date of sowing. Reaped 5—1 on 1st December. Weather very dry during growth. 10lbs. guano was used. Consider unsuitable for district, and straw too soft for nature of the soil.

Riversdale.—Mr. Harold P. Grace. Sown 30th May, 1909. Result: Good. Sown early, thickly; irrigated twice. Rhenoster ground under mountain; practically new soil; no manure applied. Reaped 15th November, 1909. Yield 8 to 1. I consider suitable for district and will pay on account of being an early wheat. Other wheat sown same time is still growing (29/11/09) and likely to do so for another month. Thrashed by trampling with horses; otherwise yield would have been more.

Paarl.—Mr. L. M. Stella. Sown 19th May, 1909. Result: Good. Sown thickly on unirrigated land; soil a black, sandy loam, to which no manure was applied at time of sowing, but same was well-manured for previous crops, such as onions and beans. Reaped on the 4th November, 1909. Yield 20 to 1. Considerable damage was wrought by birds. I consider suitable for district, but will not pay in this locality.

Piquetberg.—Mr. P. Mosel. No date given. Result: Failure. If sown early it will prove an exceptionally good wheat. I reaped on the 30th November, 1909, 8½ to 1. The "stinkluis" attacked it in September.

Hunoor.—Mr. V. O. Thiebert. Sown 15th July, 1909. Result: Good. Sown thickly on vleiground; ploughed and harrowed once; no treatment to land after sowing. Weather very dry during growth. Not attacked by frost, though all other wheats were. This wheat is very quick-growing, beating the experimental bed of Eksteen which was sown alongside to test. Reaped 13th December, 1909; yield 20 to 1. I consider this wheat a better yielder than "Our Favourite" and not so liable to shed when ripe. I gave seed a severe test; simply ploughed in and watered and used no fertiliser whatsoever. I intend sowing seed reaped next season.

Port Elizabeth.—Sown 1st September, 1909. Result: Failure. Drought and lady-birds (the latter attacked it when in ear) made a failure of the experiment.

Peddie.—Mr. C. S. Dell. Sown 17th August, 1909. Result: Good. Sown thinly on unirrigated land—heavy, red, sandy soil, fallowed prior to sowing; reaped 6th December, 1909. Yield 9 to 1. Slightly attacked by rust. I consider it to be the best wheat to sow on account of its maturing early. It was reaped three weeks before any other kind sown and is more rust-proof. The yield would have been greater if sown earlier. Weather very dry during growth. Will sow couple of bags next season if procurable. Very suitable and will pay.

Griqualand East.—Mr. W. Widdicombe. Sown 20th June 1909. Result: Good. Destroyed by locusts just when fit to reap. It grows well, and I think is very suitable to this district.

Mr. W. A. Hart. Result: Good. Sown very late; light, sandy soil; no treatment, or manure. Reaped early in January. The yield (116lbs.) was greater than any other local wheat. It should be sown in April and May. It is suitable and will pay.

Bathurst.—Mr. J. B. Wilson. Sown September 16th, 1909. Result: Failure. Destroyed by rust. Not suitable.

Seymour.—Mr. Frank Graham. Sown 15th July, 1909. Result: Failure. Sown late; irrigated twice; manured well with kraal manure. Attacked by rust. No yield. I consider it a failure for this district.

East London.—Mr. R. Wakeford. Sown 1st August, 1909. Result: Good. Sowed rather late; yield 100lbs. Reaped 2nd December, 1909. It is suitable and will pay. Dry weather retarded growth.

Mr. T. H. Dredge. Sown September, 1909. Result: Failure. Destroyed by rust. Sown in September, 1909.

Alexandria.—Mr. Fred Crofts. Sown August 27th, 1909. Result: Failure. Destroyed by hail.

Mr. C. van Rensburg. Junr. Sown 16th August, 1909. Result: Good. Sowed thickly on unirrigated fertile land, no manure applied and no treatment after sowing. Weather very dry and hot during growth. Reaped on the 8th December, 1909; yield 6—1. No insects attacked it. I consider it very suitable for district and will pay. It stood the drought well, and if it had been a rainy season the yield would have been considerable.

Fort Beaufort.—Mr. Jack de Beer. Sown 19th May, 1909. Result : Failure. Sown thinly on irrigated land. Weather fairly dry during growth. Irrigated three times. Badly attacked by rust, while Rietti wheat, which was sown next to it at the same time, was almost free. Will give it another try before finally giving opinion. Reaped nil.

Adelaide.—Mr. F. J. Nel. Sown 12th June, 1909. Result : Failure. Sown late; irrigated on 30th June and repeatedly thereafter. Sandy soil, new and rich; no manure applied. Reaped November 20th. Yield 500 lbs. Attacked by rust soon after coming into ear. I consider it unsuited for district and will not pay on account of not being rust-proof. Rust was very general this season.

Xalanga.—Mr. T. Costello. Result : Good. Sown late. Reaped 7th December, 1909. Yield 165 lbs. Would have yielded more but for birds. It is a very good all-round wheat. It is suitable in every way and will pay.

Wodehouse.—Mr. W. S. Warner. Sown June, 1909. Result : Failure. Destroyed by locusts.

TENNYSON WHEAT.

Seven reports have come to hand of this variety. Three are good, one indifferent and three failures, two of the latter being due to rust and one to locusts.

Durbanville.—Mr. H. Theunissen. Sown 20th April, 1909. Result : Good. Sown on unirrigated land, clay and gravel soil. Applied 40 lbs. Government guano. Very dry in beginning; good season towards end. Reaped 20 to 1 lbs. on 27th November. Very suitable and will pay well. It is a very good grower and yielder and the longest ear I have ever seen. Can be sown early.

Xalanga.—Mr. A. M. C. Kaschula. Sown 25th June, 1909. Result : Good. Sown at right time; no manure; ploughed once after mealie crop. It is very suitable and will pay well. I only reaped 5½ lbs. owing to birds eating it. It was beautifully healthy.

Mr. J. Costello.—Sown 6th June, 1909. Result : Good. Sowed rather late on unirrigated sandy loam soil. Reaped 15th February, 1910. Yield 7½ to 1. It is very suitable and will pay. The yield would have been much greater, but I allowed it to get too ripe. It should be reaped just when it turns yellow.

Lower Paarl.—Mr. W. K. van der Spuy. Sown 31st May, 1909. Result : Indifferent. Sown late; fertile soil. Applied one bag guano mixed with same quantity sheep manure to one morgen. Can't say if suitable or whether it will pay.

Bredasdorp.—Mr. H. C. Goldie. Sown June 10th, 1909. Result : Failure. Sown late. Karoo soil. Applied 34 lbs. Supers. Badly attacked by rust. Reaped December 2nd, 1909. I consider it is not suitable for this district and will not pay.

Griqualand East.—Mr. W. Widdicombe. Sown June 20th, 1909. Result : Failure. Destroyed by locusts.

East London.—Mr. C. Dredge. Sown September 9th, 1909. Result : Failure. Destroyed by rust and blight when two months old.

MEDEAH WHEAT.

This is a very hard wheat, a good cropper and stools well if not sown too late. It produces a large grain, and makes splendid bread. Nine reports have come to hand. Three of these are good, three indifferent and three failures. Two of the latter are due to rust and one to drought.

Stellenbosch.—Mr. A. Kennedy. Sown June 17th, 1909. Result : Indifferent. Sown fairly late; thinly, unirrigated land, clay, loamy soil. Government guano applied at rate of 100 lbs. per acre. Sowed on top and harrowed after sowing. Rain-fall very fair. Reaped 4th December, 1909. Yield 15½ to 1. I consider Rietti and Gluyas Early better for this district.

Swellendam.—Mr. A. Kennedy. Sown July 20th, 1909. Result : Good. Sown right time, thinly, unirrigated, very stony soil, broken up one year before, re-ploughed when sown and well harrowed. Very little rain during growth. Applied 10 lbs. Government guano. Reaped December 20th, 1909. Yield 7½ to 1. No disease or insects. I consider very suitable for district and will pay well.

Van Rhynsdorp.—Sown June 14th, 1909. Result : Good. Sown late, thinly, unirrigated land; sandy soil; no manure applied. Terrible east winds, north winds and thunderstorms during growth. Rust attacked it when 12 inches high. Reaped first week in December, 1909. Yield 1½ bags. Will sow again this season and express an opinion later as to its being suitable for district, etc.

Oudtshoorn.—Mr. W. J. Northcott. Sown 23rd July, 1909. Result: Failure. I do not consider that this can be compared with either Rietti or Gluyas Early, and do not think it suitable.

Sidbury.—Mr. H. G. Daniell. No date given. Result: Indifferent. Sown very late, thinly, unirrigated land, red, loamy soil; ploughed twice and harrowed; no manure applied; weather very dry during growth. Reaped 27th December, 1909; yield 6—1 lbs. Cannot say if it will pay, or whether suitable for district. There appears to be no difference between this and "Zwaart Baart" wheat.

Worcester.—Mr. D. S. Botha. Sown 12th June, 1909. Result: Failure. Sown very late, thickly; reaped December 12th; yield 10—1. Badly attacked by rust, so much so that even that which was reaped is useless.

Malmesbury.—Mr. Alwyn Carstens. Sown May 15th, 1909. Result: Indifferent. Sown broadcast thinly, unirrigated land. Reaped 1 bushel on 15th November, 1909. Attacked by rust. Will pay if not attacked by rust.

Xalanga.—Mr. J. Costello. Sown June 10th, 1909. Result: Failure. It cannot stand drought at all. Will not pay without irrigation. No yield on account of drought.

Bredasdorp.—Mr. J. W. Myburgh. Sown June 16th, 1909. Result: Good. Sown thinly, rather late. Applied a wagon load of sheep manure. It came up very thinly, which I attribute to its being machine-threshed wheat. Reaped December 13th, 1909; yield 110 lbs. It is suitable and will pay.

COMEBACK WHEAT.

This variety closely resembles the Darling wheat. It yields a grain of excellent quality and makes good bread, but is by no means immune from rust. Fourteen reports have been received. Six of these are good, two indifferent and six failures, three of the latter were due to drought, two to rust and one to blight.

Cradock.—Mr. I. B. van Heerden. Sown May 19th, 1909. Result: Good. Sown early (ought to be sown in June); heavy black soil. Reaped 20th December, 1909; yield 42 to 1. It was killed by frost in the beginning of October; then irrigated again. It was slightly attacked by rust. But for the frost the yield would have been twice as great. It was irrigated altogether about six or seven times. It certainly is a very promising wheat.

King William's Town.—Mr. Carl Zietsmann. Sown September 9th, 1909. Result: Good. Sown late, thinly, unirrigated land well harrowed after sowing. Sandy soil; no manure applied. Weather very dry; no rain. Reaped December 23rd, 1909. Yield $4\frac{1}{2}$ to 1. Free of rust and disease. Yield would have been heavier but for drought. I think it will pay.

Bredasdorp.—Ohlsson's Potteberg Farms. Result: Failure. Failure owing to exceptional drought. I will sow again next season.

Mr. J. W. Myburgh. Sown June 16th, 1909. Result: Failure. I only reaped 5 to 1 lbs. owing to rust attacking it when it was coming into ear. I do not think it will pay on account of the shortness of the ear, which, however, may be due to rust.

Tembuland.—Mr. R. H. Harding. Sown 3rd June, 1909. Result: Good. Sowed late. If sown early it will do fairly well and will pay. It did not take rust, and stands the drought fairly well. Reaped December 7th, 1909. Yield 9 to 1.

Elliot.—Mr. E. G. Marillier. Sown 27th May, 1909. Result: Failure. Owing to drought this season has been a disastrous one for all crops.

Mr. J. Hart. No date given. Result: Failure. Drought.

Bathurst.—Mr. J. B. Wilson. Sown 16th September, 1909. Result: Failure. Took rust when piping. Not suitable and will not pay.

East London.—Mr. R. Wakeford. Sown August 1st, 1909. Result: Indifferent. Reaped in December, 1909. Yield 6 to 1. It is suitable and will pay.

Mr. Thos Dredge. Sown September 9th, 1909. Result: Failure. This wheat is no good. It took blight very badly. It is not suitable and will not pay.

Piquetberg.—Mr. P. Mosel. Sown 1st June, 1909. Result: Good. This wheat should be recommended to every farmer in this district. It should be sown in April.

Durbanville.—Mr. H. Theunissen. Sown 1st June, 1909. Result: Good. Sowed 10 lbs. in due time; fairly thick; unirrigated land; clay and gravel soil; applied 40 lbs. Government guano. Reaped November 24th, 1909; yield 20 to 1. Weather very dry at beginning; good towards end. I consider it is suitable and will pay. Is a very good grower and a hard wheat.

Cathcart.—Mr. T. F. Miller. Sown 12th June, 1909. Result: Indifferent. Sown right time, thinly, irrigated land; ploughed; cultivated and harrowed twice. Took rust after blossoms fell during misty weather. Snow fell on August 15th and September 1st, and also 4 inches rain. Kraal manure applied two years previous to

sowing. Reaped December 31st, 1909. Yield 28 to 1. By no means suitable for district, and will not pay.

Tulbagh.—Mr. E. J. M. Schenk. Sown May 17th, 1909. Result: Good. Sown early on unirrigated land; loose gravel soil; applied 100 lbs. basic slag. Attacked by rust after coming into ear. Reaped on 6th November, 1909. Yield 10 to 1. Consider suitable if rust does not attack it.

DARLING WHEAT.

Excellent as is the quality of the grain and of the bread made therefrom, and favourable as are many of the following reports, it yet remains an established fact that this variety frequently suffers from rust, and its cultivation is therefore too precarious to be recommended except in districts naturally exempt from the danger. Twenty-one reports have been received, of which eight are failures, mostly on account of rust. These results quite bear out last year's findings, when four times as many reports were received.

Paarl.—Mr. H. Theunissen, Kraaifontein. Sown June 6th, 1907. This wheat has been tried for three successive years and has always been killed by rust, especially in low-lying, sheltered spots.

Malmesbury.—Mr. W. Pretorius. Sown June, 1906. Result: Good. Very suitable and will pay.

Mr. John Steyn. Sown end of May. Result: Good. Is suitable to district and I think it will pay if it does not take rust. Reaped end of November. Yield 50—1. Sown broadcast on unirrigated soil.

Mr. S. P. van Blerk, Klipheuevel. Sown 15th May, 1906. Result: Good. Suitable and will pay in this district. Reaped 15th November. Yield 5—1.

Wellington.—Mr. P. J. D. Wessels. Sown 15th May. Result: Indifferent. Very good wheat for white bread: Gives good ear, but cannot judge if it is rust-resisting. Will certainly pay if rust-proof. Reaped November. Yield 5 1.

Hermon.—Messrs. Bresler & Co. Sown May 20th, 1907. Result: Good. Very suitable and will certainly pay. Slight rust in the straw, but grain remained sound. Rietti, which ripened much later, had rust even in the grain. Seems a good cropper and has excellent milling qualities.

Caledon.—Mr. P. K. Hoffman. No date given. Result: Good. Suitable and will pay.

Mr. P. L. Uys. Sown 25th May, 1906. Result: Good. Sown broadcast and thinly on unirrigated land. Reaped December, 1906. Yield 20—1. Very slight indications of rust. Certainly suitable for district and will pay. Hardly a good year for testing its rust-resisting capabilities, being so extremely dry.

Swellendam.—Mr. Donald Moodie. Sown 5th June, 1906. Result: Poor. Very doubtful. About 10 square yards killed by rust. The grain in the rest of it seemed quite unaffected, but as it ripens later it will be liable to be killed by rust. Reaped end of November. Yield 15—1.

Mr. R. Cook. Sown 26th July. Result: Good. Suitable and will pay. Would advise farmers to make more use of this variety.

Riversdale.—Mr. E. E. Smalberger. Sown June, 1907. Attacked by rust just as it was shooting into ear, and entirely destroyed the crop.

Mr. G. Reitz. Sown 26th July, 1906. Result: Good. This crop was grown in a very dry season without any rain at all. It was irrigated when coming into ear, and compared with other wheats sown at the same time and with same water, proved to be the best wheat sown. Yield 200 lbs. from 20 lbs.

George.—Mr. D. A. McIntyre. Result: Good. Have tried this wheat now for three seasons. It comes to maturity three weeks earlier than Rietti.

Uniondale.—Mr. J. H. Kritzing. Sown June, 1907. Entirely destroyed by rains. Have sown it before and found it excellent.

Rosmead.—Mr. W. E. Collett. Sown 29th May, 1906. Result: Good. Sown broadcast and thinly on irrigated soil. Reaped 22nd January, 1907. Yield 10—1. Not very suitable for district on account of the birds attacking it; it would pay but for them. A little rust noticeable just before ripening. Very good yield of bundles (170) and nice white straw.

Richmond.—Mr. W. C. Viljoen. Sown 20th July, 1906. Sown broadcast on irrigated land. Reaped December, 1906. Rather too tender for the district. Was badly damaged by late frost.

Middelburg.—Mr. R. H. Douglas. Sown (a) 1st June, 1906; (b) 20th July, 1906. Result: Poor. Sown broadcast on (a) irrigated, and (b) unirrigated lands. (a) Reaped 15th January, 1907; (b) 20th January. (a) No rust, but thin crop owing

to hail. (b) Slight rust. Yield would have been good but for the hail. Rust might have been worse if yield had been heavier. Does not seem such a paying crop as other varieties.

Tarkastad.—Mr. H. C. van Heerden. Sown 5th July, 1906. Result: Good. Sown broadcast and thickly on irrigated land. Reaped 19th December, 1906. Yield 16½—1. One of the earliest. A very good wheat and suitable for district.

Barkly East.—Mr. Claude Orpen. Sown 12th July, 1906. Result: Good. This wheat will certainly pay; it is not susceptible to rust. Judging by my experience, not easily knocked out by hail; easy to reap and thresh; useful chaff and straw for feeding to stock, having no beard. Yield 225 lbs. from 2 lbs. sown.

Stutterheim.—Mr. J. C. Fynn, Dohne. Sown June. Germinated well, but died off during drought.

Kokstad.—Mr. W. F. Raw. Sown 27th April, 1906. Result: Good. Very suitable for district and will pay to grow. Sown broadcast on irrigated land. Reaped 10th December, 1906. Yield 7½—1. Quite healthy all through. Best time to sow, end of May or early June, as birds attack it and destroy it a lot.

Mr. W. F. Raw. Sown end of April, 1906. Result: Good. Ripens very quickly, being ready to reap early in December. The birds destroyed a good deal, but I got a decent crop considering the state of the seed when planted, being weevil eaten.

BUDD'S EARLY WHEAT.

While proving its earliness and resistance to drought, as well as the good grain it bears, this wheat has so frequently shown signs of rust that it cannot be recommended even for further trial. It is interesting to observe how of the four wheats of the same class and origin, Gluyas, Budds, Darling and Jonathan, the first has shown such a decided difference and superiority. The results published are decidedly instructive.

Rosmead.—Mr. W. E. Collett. Sown 18th July, 1906. Result: Good. Sown broadcast and thinly on irrigated land. Reaped 22nd January, 1907. Yield 25—1. Very suitable to district and will decidedly pay. The wheat is one of the three sent later and was only sown in July, whereas the other twelve were sown in May. In spite of this, it ripened almost as soon and has given a most satisfactory yield, and the quality of the grain is exceptionally good.

Tarkastad.—Mr. H. C. van Heerden. Sown 5th July, 1906. Result: Good. Sown broadcast and thinly on unirrigated land. Reaped 20th December, 1906. Yield 25—1. Suitable for district and will pay.

Richmond.—Mr. J. G. Hauptfleisch. Sown 15th August, 1906. Result: Poor. Broadcasted thickly on irrigated land. Reaped December 25th-30th. This wheat is unsuitable to the district; being beardless, was badly attacked by birds, so could not judge the yield. Touched by rust beginning of December.

Barkly East.—Mr. Claude Orpen. Sown 12th July, 1906. Result: Good. Yield 75 lbs. from 12 lbs. Damaged by poultry and severe frosts, otherwise it will pay and is suitable to the district; holds well against drought and rust. Easily harvested.

King William's Town.—Mr. C. E. Dell. Sown June 13th, 1906. Result: Fair. Sowed 12 lbs.; reaped 120 lbs. Fairly suitable. Attacked by a little rust.

Lower Albany.—Mr. A. W. Staples. Sown 25th June, 1906. Result: Bad. Unsuitable to this part. Destroyed by rust when coming into ear.

Malmesbury.—Mr. John Steyn. Sown end of May. Result: Poor. Sown broadcast and thinly on unirrigated land. Rust appeared on the straw and some late ears. Not suitable, as rust has not been noticeable this season.

GOLDEN BALL WHEAT.

The reports on this old Colonial favourite are encouraging. Although at times attacked by rust and injured by frost, there is no doubt that this is a very desirable and popular wheat and one likely to be grown wherever possible. It was curious how it had almost entirely disappeared and was restricted to Post Retief and the adjacent valleys, but thence it is likely to spread, especially over the inland parts of the Colony. The reports speak for themselves.

Rosmead.—Mr. W. E. Collett. Sown 29th May, 1906. Result: Good. Sown broadcast and thinly on irrigated land. Reaped 22nd January, 1907. Yield 21½—1. Suited to district and will pay. Very little sign of rust. This variety was well known and grown a good deal fifteen or twenty years back, but seems to have been

lost sight of entirely in this district, and I am glad that I have been able to give it a fresh start. This sample was very pure and has given 120 bundles of very fine wheat, which promises to give a good yield of grain and nice white chaff or straw.

Tarkastad.—Mr. H. C. van Heerden. Sown 5th July, 1906. Result: Good. Sown broadcast and thinly on unirrigated land.

DURUM WHEAT.

Durum wheat was imported especially as this class of wheat is so drought-resistant and generally free from rust. Of the eight reports received this season only one speaks well of it; in most other instances rust destroyed it more or less completely, and it need not therefore be further tried, but condemned at once.

PRIVATE EXPERIMENTS.

Besides the wheats mentioned above, Mr. H. Theunissen, of Langeberg, Kraaifontein, a large grower of wheat and Texas oats, supplies the following very interesting particulars concerning certain of fourteen different varieties which he sowed experimentally on his farm in the Koeberg.

Glugas Wheat he refers to as the king of wheats, early, drought, and rust-resistant, yielding well, and supplying a fine white flour which makes beautiful light bread. It should be sown in the end of May or early in June in that neighbourhood.

Darling Wheat, Mr. Theunissen reports, as a very good grower, but hard, and not giving such nice bread. It ought to be sown in the middle of May.

Of *Comet Wheat* he speaks very highly. Five pounds of seed were sown on one-sixth of an acre, very thin that is, and assisted with a half-load of kraal manure and 50 lbs. of guano. It was put in on 6th June and reaped on the 7th December, just six months, and the return was 200 lbs. or 40-fold. It took no rust whatever, and is a dark grain, loose in the ear and much resembling Rietti. It will be further tried.

In sowing *Rietti Wheat* it is now necessary to be careful in the selection of good seed, unmixed and true to name, by preference long dark-eared form. Sow in May as it is a slow-growing variety.

Eenbeen, or Eenbeentje wheat, so called because it does not stool out, much favoured in the north-west, Clanwilliam and Van Rhynsdorp, is a good growing wheat, furnishing a particularly white sample which in turn gives a good white and light loaf. It is one of the earliest of wheats, and may be sown in the end of May or the first few days in June. It took rust in the leaf and stem, but not very much, and it disappeared before harvest, which yielded 25-fold.

Siebritz wheat must be sown early and gives a particularly fine quality of grain. It resembles Rietti, but is somewhat earlier in ripening. The yield was 30-fold on the higher ground, but on the lower sheltered portions it suffered considerably from rust during October.

Bruin Caledon Baard wheat grows very tall and strong, and yields a dark wheat like Rietti, and gives a dark bread, but a heavy yield. It is to be sown in May. It is subject to rust.

Bertus wheat, from Riversdale, was a poor crop, and was finally destroyed by rust. Samples of the Swedish wheats tried at the Experiment Stations were specially sent to Mr. Theunissen for independent trial.

Of *Bore wheat* he reports that it grew flat on the ground like sweet potatoes till December, when it began to shoot up, but was badly attacked by rust and is therefore quite unsuitable for us.

Kolben wheat, from the same source, also took rust so severely that there was nothing to reap.

In his reports Mr. Theunissen draws special attention to the fact that many wheats suffer much from rust in a damp hollow sheltered by a row of trees from the prevailing wind, the south-east, but remained quite clear of disease on the drier, airier slopes above. This correct observation points to the variability of the disease and to the great danger that exists in sowing varieties at all subject thereto, as if there are only a few close, damp and muggy days during the growing season, especially in October and November, it may be sufficient to destroy the crop. This is a fact which cannot be too strongly emphasised, and farmers must bear in mind the grave risk they run in sowing kinds known to be subject to the disease, especially when there are others known to be naturally more immune and at the same time not inferior to the best sorts in milling properties.

RIETTI WHEAT.

This wheat has for some years now been one of the most extensively grown varieties in the Western Province, and has more recently spread to the South-West, Midlands and Eastern Province. Although apparently singularly rust-resistant, it is not altogether immune, and from time to time we hear of its being attacked. It is not considered rust-resistant in the Orange River Colony nor in the Transvaal, testifying to its apparent unreliability at high altitudes, which fact is substantiated by recently conducted experiments. The 1907-08 reports, of which twenty-two were received, are very good. Eighteen of these are good, 1 indifferent, 2 failed on account of drought, and 1 through rust. Only two reports are to hand of the 1909 experiments, 1 being good and 1 a failure through rust.

Rosmead.—Mr. W. E. Collett. Sown 18th July, 1906. Sown thinly and broadcast on irrigated land. Reaped 26th January, 1907. Yield $37\frac{1}{2}$ for 1. This wheat (being one of the late varieties) came on remarkably well and gave by far the largest yield in bundle and also in grain. The only drawback is that it sheds the seed very rapidly. Suitable and will pay. Locusts attacked it just when reaping.

Graaff-Reinet.—Mr. R. P. Kingwill. Sown 6th August, 1906. Sown broadcast and thinly on irrigated land. Reaped 13th February, 1907. Yield 18 lbs. from 20. Attacked by rust when ears were well advanced. Suitable for district and will pay (if any wheat will). I consider it a good wheat though trial was a failure. It was the last to be attacked by rust. Mostly destroyed by birds.

Middelburg.—Mr. R. H. Douglas. Sown (a) 1st June, 1907; (b) 20th July, 1907. Result: Good. Sown broadcast and medium on (a) irrigated land. Reaped 15th January. Decidedly suitable for district and will pay given a fair season. I consider it the best of the three varieties sent for trial. It seems rust-proof. (b) Unirrigated land. Reaped 20th January. Attacked by locusts. Constant rains from September; also a heavy hail storm.

Richmond.—Mr. Jas. G. Hauptfleisch. Sown 15th August, 1906. Result: Good. Rietti I consider very good for district, being an excellent grower, hardy against frost, rust-resistant and a good yielder. Crop being isolated was greatly damaged by birds, so could not judge the yield.

Tarkastad.—Mr. H. C. van Heerden. Sown 5th July, 1906. Result: Excellent. Sown broadcast and thickly on irrigated land. Reaped 24th December. Yield $16\frac{3}{4}$ —1. Suitable and will pay. I consider it one of the best.

Barkly East.—Mr. Claude Orpen. Sown 12th July, 1906. Result: Good. Does not appear to be susceptible either to frost or rust, and withstood three months' unmitigated drought. Yield 80 lbs., but part of the crop was destroyed by poultry, otherwise this would have been an excellent crop.

Stutterheim.—Mr. T. C. Fynn. No date given. Germinated well, but killed by drought.

East London.—Mr. M. Tindale. Sown June 25th, 1907. Result: Indifferent. Very poor result owing to dry season. Both grain and forage crops were failures.

King William's Town.—Mr. C. E. Dell. Sown June 12th, 1906. Result: Good. Very suitable and will pay. Does not require irrigation. Sowed 11 lbs., reaped 250 lbs. Not attacked by any disease.

Cathcart.—Mr. J. J. Esthuysen. Sown July, 1907. Result: Good. Sowed 10 lbs. yield 160 lbs. Will pay very well. Drought and rust-resisting and heavy in weight. Makes very good white meal.

Cathcart.—Mr. W. F. Hall. No date given. Result: Good. Crops in a very backward condition owing to severe drought and very late frosts. This wheat will take a lot of beating. Stood drought extremely well.

Bedford.—Mr. A. V. C. Shone. Sown 9th June, 1906. Result: Good. From my own experience I consider this wheat will pay better and grow better than any other. Yield 600 lbs. from 20 lbs. sown, i.e., 30 to 1. This wheat grew very tall—about 18 inches higher than the Gluyas—stood well, and the yield would have been far greater had not three-quarters of the ears been damaged by hail. Considering how we are troubled by rust in this part, and the wet season, this wheat did remarkably well.

Lower Albany.—Mr. A. H. Robey. Sown 15th June, 1906. Result: Fair. Sown broadcast and thickly on unirrigated land. Reaped December. Yield 19—1. Suitable, and I think it will pay in this district. I am trying it again this year.

Uitenhage.—Mr. P. Kludgen. No date given. Result: Fair. Yield 90 lbs. from 10 lbs. sown. Unable to judge whether rust-resisting, as owing to the extremely dry season no rust has appeared in the district. Wants cutting before it becomes too dry, as it is apt to fall out easily.

Riversdale.—Mr. D. Versfeld. Sown July 5th, 1907. Whole crop destroyed by rust. Does very well in some parts of the district. No disease.

Swellendam.—Mr. J. P. Eksteen. Sown 6th June, 1907. Result: Good. 10 lbs. sown; 162 lbs. yield. Most certainly will pay. Not attacked by any disease.

Mr. H. P. Eksteen. Sown June 15th, 1906. Result: Good. Sowed 10 lbs.; reaped 300 lbs. Rust-resisting. Will pay well.

Mr. P. N. Uys. No date given. Result: Good. Looks well and has not shown a speck of rust, although the Durum variety was attacked pretty badly.

Caledon.—Mr. P. K. Hoffman. No date given. Result: Good. Suitable and will pay. Slightly attacked by rust.

Malmesbury.—Mr. J. S. van Reenen. Sown June, 1906. Result: Good. Suited to the district and will pay. Sowed 25 lbs.; reaped 490 lbs. Not attacked by disease.

Paarl.—Mr. H. Theunissen. Sown June 6th, 1907. Result: Good. Sowed 20 lbs.; yield 600 lbs. This wheat has been sown in the district for the last 12 years, and is very suitable if sown on high, unsheltered ground. Then it is not attacked by rust, which always happens if sown on low-lying ground. Care should be taken that only the pure Rietti with the long black ears, a little loose, is sown.

Piquetberg.—Mr. J. H. L. Dale. Sown May 14th, 1906. Result: Fair. Will pay if plenty of late rains fall. Rietti varieties generally do well in the Karoo. No disease.

Malmesbury.—Mr. Dick Schreuder. Sown 15th May, 1909. Result: Good. Sown late; unirrigated. Dry Karoo soil. Weather very dry during growth. The crop did not grow well. Reaped 20th November. Yield 7 to 1. I consider that it is suitable considering the adverse circumstances.

Caledon.—Mr. R. Metcalf. No date given. Result: Failure. Destroyed by rust.

JONATHAN WHEAT.

In the 1907 experiments this wheat was only a modified success. No heavy yields were reported, and drought and rust have both injured the crops. Good as it doubtless is, it seems inferior to Gluyas, and not likely to become as popular, although in appearance it is not dissimilar. In the 1909 experiments only 9 reports are to hand. Only 2 are good, one fair and six failures, due to rust, drought, locusts and hail.

Malmesbury.—Mr. S. P. van Blerk, Klipheuvcl. Sown 15th May, 1906. Result: Fair. Will pay in this district if it does not take rust. It is a good grower, but got rust when full grown. Reaped 15th November. Yield 8—1.

Mr. M. Smuts (H. son). Sown 20th May, 1906. Result: Good. Suitable and will pay in this district. Yield 20—1.

Mr. J. A. R. van Blerk. Sown 4th June, 1906. Result: Poor. Not suitable and will not pay in this district. Yield 17—1.

Mr. J. N. H. Steyn. Sown end of May. Result: Fair. Suitable and will pay in this district. Reaped end of November. Yield 10—1.

Piquetberg.—Mr. J. H. L. Dale. Sown May 11th, 1906. Result: Indifferent. 20 lbs. sown; 70 lbs. reaped. Cannot recommend owing to taking rust and not withstanding drought.

Wellington.—Mr. P. J. D. Wessels, Zoutendal Siding. Sown 15th May, 1906. Result: Poor. Being an early wheat it might be liable to get rust, otherwise it seems to answer. Reaped November. Yield about 5—1.

Tulbagh.—Dr. Beck, M. L. A. Sown 23rd June, 1906. Killed by rust before the crop was ripe.

Ceres.—Mr. A. Ohlsson. Sown 8th June, 1906. Result: Fair. I think this wheat will answer well. It is a hard wheat with no rust, and gives a good weight. Cut 20th December. Yield 14 4-5-1.

Bredasdorp.—Mr. A. P. Celliers. Sown 7th May, 1906. Result: Poor. Do not consider it suitable to district. Was attacked by ordinary yellow rust at late stage. If no rust appears it will pay. Yield 20—1.

Rosmead.—Mr. W. E. Collett. Sown 29th May, 1906. Result: Good. Sown broadcast and thinly on irrigated land. Reaped 15th January, 1907. Yield 21½—1. No rust to speak of. Suitable and will pay in this district. Has given 120 bundles of nice white straw and good grain.

Tarkastad.—Mr. H. C. van Heerden.—Sown 5th July, 1906. Result: Good. Sown broadcast and thickly on irrigated land. Reaped 21st December, 1906. Yield 14½—1. Suitable and will pay in these parts. I consider it one of the best wheats.

Richmond.—Mr. J. G. Hauptfleisch. Sown 15th August, 1906. Result: Poor. I do not think it suitable nor will it pay in this part. Just touched by rust in December. Could not judge the yield as, being a beardless variety, the birds did considerable damage.

Barkly East.—Mr. Claude Orpen. Sown 13th July, 1906. Result: Fair. Yield 65 lbs. from 12 lbs. Smallness of yield owing to damage caused by poultry, but I consider it will pay fairly well and is fairly suitable to district.

Adelaide.—Mr. John Ainslie. Sown 20th June, 1906. Result: Good. I consider this wheat suitable to district and will pay. Was attacked in patches by a sort of blight when coming into flower. Yield 30 to 1. Intend to reserve all the seed to sow next season.

Stutterheim.—Mr. J. C. Fynn. No date given. Germinated well; then killed by drought.

King William's Town.—Mr. C. E. Dell.—Sown July. Crop so poor that it was ploughed in. Was sown too late and suffered for want of rain.

Grahamstown.—Mr. L. B. Webber.—Sown two months too late. Result: Failure. No yield; attacked by rust. Not suitable and will not pay.

Bredasdorp.—Mr. A. C. Goldie. Sown 10th June, 1909. Result: Good. Sown on Karoo soil; applied 35 lbs. superphosphate. Weather dry during growth. Reaped 10th December; yield 12—1. Suitable and will pay.

Peidlic.—Mr. C. S. Dell. Sown 13th August, 1909. Result: Fair. Sown late, thinly, on unirrigated land; heavy red sandy soil; no manure. Badly attacked by rust six weeks after coming up. Reaped 22nd December. Yield 7—1. Wheat did not have a fair trial on account of severe drought. Will try it again next season.

Hamor.—Mr. V. S. Riebert. Sown 15th July, 1909. Result: Good. Sown late on irrigated vlel ground. No manure applied. Weather very dry and severe frosts on several occasions. Reaped December 24th. Yield 25 to 1. Seed came up very badly, one-half not germinating. On account of being machine cleaned, the "pits" are damaged, otherwise yield would have been double. Should be sown here in May very thinly. Has a magnificent stool. I tested it against our favourite "Eksteen" on same soil and identical conditions, except that the latter was not machine cleaned, but tramped, and all the seeds germinated, but in spite of this the yield was 50 lbs. less than the Jonathan. I consider it splendid wheat for district and will pay.

Nalanga.—Mr. J. Costello. Sown 6th June, 1909. Result: Failure. This wheat does not appear to stand drought at all and is a failure.

Ugie.—Mr. W. S. Warner. Sown June, 1909. Result: Failure. Destroyed by rust.

Alexandria.—Mr. Fred Crofts. Sown 27th August, 1909. Result: Failure. Destroyed by hail.

Port Elizabeth.—Mr. H. A. Mobbs. Sown September, 1909. Result: Failure. Failure owing to drought and ladybirds. The latter attacked it when in ear.

Seymour.—Mr. F. L. Graham. Sown 15th July. Result: Failure. Sown late on good mixed loam soil well manured with kraal manure. This wheat is no good for district as it was simply "eaten up" by rust, which appeared just before coming into ear. The extremely dry season may be responsible for this.

HUDSON'S, BELOTURKA, JOHN BROWN, CRETAN, PURPLE STRAW, THEW.

Only a few reports have been received of the abovenamed varieties of wheat, and as most of these are unsatisfactory fuller details will be published later on when more reports are to hand.

CHEVALIER BARLEY.

Twenty-five reports have been received on this variety. Eleven are good, 3 indifferent and 11 failures due to various causes, such as drought, cutworm, hail and locusts, etc.

Elliot.—Mr. C. Swarbreck. Sown August 10th, 1909. Result: Failure. Destroyed by hail.

King William's Town.—Mr. Carl Rietzmann. Sown 9th September, 1909. Result: Failure. Drought.

East London.—Mr. R. Wakeford. Sown 10th August, 1909. Result: Failure. Destroyed by locusts.

Bedford.—Mr. Wilfred Mapham. Sown 13th May, 1909. Result: Failure. Extreme drought.

Colesberg.—Mr. E. G. Williams. Sown May, 1909. Result: Failure. I asked for a foreign crop, not a barley. It is a failure.

Kokstad.—Mr. G. N. Karg. Sown September 1st, 1909. Result: Good. Reaped 160 lbs. on the 4th January, 1910. Suitable and will pay.

Beaufort West.—Mr. I. van Tulleken. Sown 23rd May, 1909. Result: Indifferent. I consider this barley requires to be acclimatised before it will answer.

Porterville Road.—Mr. C. R. Plumbly. Sown 20th May, 1909. Result: Good. Sown on sandy loam soil. Applied 150 lbs. basic slag to the acre. Reaped 220 lbs. first week in November. It is suitable and will pay.

Bredasdorp.—Ohlsson's Potteberg Farms. Result: Failure. Drought.

East London.—Mr. C. Dredge. Sown 15th June, 1909. Result: Good. Destroyed by locusts. It grew splendidly until destroyed.

Piquetberg.—Mr. E. J. M. Schenk. Sown 14th June, 1909. Result: Failure. Not suitable. Soil too poor. I applied 50 lbs. superphosphate and 50 lbs. basic slag to area sown, viz., 182 yards x 12 yards. Got no yield.

Mr. P. Mosel. Sown 1st June, 1909. Result: Indifferent. I do not consider this suitable. It is too thin in the straw and was attacked by "Stink-luis," which was first obtained in September, 1909.

Stutterheim.—Mr. C. H. Kaschula. Sown 3rd September, 1909. Result: Good. Sown late. Reaped 6th January, 1910. Yield 200 lbs. I cannot see any difference between this and my own, which I have been sowing for many years. It is suitable and will pay.

Mr. W. H. Palmer. Sown 5th September, 1909. Result: Failure. Sown early enough. Two thirds destroyed by cutworm. Only reaped 65 lbs. Weather very dry during growth. It ought to be sown in July or August.

Mannisburg, C.C.—Mr. J. P. Smit. Sown 8th June, 1909. Result: Good. Sown at right time on light, sandy soil. Reaped 10th November, 1909. Yield 100 lbs. grain. No manure applied. I consider excellent for district and will pay. But for the severe drought the yield would have been considerably more.

Aliwal North.—Mr. A. W. Higgins. Curator. Sown 3rd July, 1909. Result: Good. Sown early. Damped seed and coated same with lime before sowing. Reaped 15th December, 1909. Yield 85 lbs. It is a nice clean grain. I put it on the show and the judges commended it as a good sample.

Paarl.—Mr. L. M. Stella. Sown 19th May, 1909. Result: Failure. The seed germinated, but stood stationary for two months and then gradually turned yellow. Our soils are too poor for barley, and unless they receive a good dressing no crops are forthcoming. I consider soil is wanting in humus.

Cathcart.—Mrs. T. F. Miller. Sown 12th June, 1909. Result: Good. Sown right time on irrigated land, sandy soil; cultivated; rolled and harrowed after sowing. Manure applied two years previous; reaped 29th December, 1909; yield 325 lbs. Decidedly suitable for the district and will pay. It is a splendid barley; yields well and weighs well.

Elliot.—Mr. J. Hart. No date given. Result: Failure. Drought.

Venterstad.—Mr. F. L. Fossati. Sown 11th August, 1909. Result: Failure. Sown medium time, thickly, irrigated sandy soil; ploughed once; reaped 18th December, 1909. Yield 130 lbs. It is not suitable as it requires more water than the ordinary old Beard barley.

Segmour.—Mr. Adam Dryden. Sown 2nd July, 1909. Result: Good. Sown right time, irrigated three times; ploughed and harrowed and had it picked up with the hoe. Reaped early in December. Weather very dry. Yield 205 lbs. Is suitable and will pay. I consider this to be a splendid barley and will pay well. The crop when in ear was a picture. I recommend that it be not sown on too rich soil or too thickly, or else in a rainy season it will bend over.

Mr. Frank Graham. Sown 15th July, 1909. Result: Good. Sown right time; irrigated twice; ploughed and harrowed twice; well manured with kraal manure. Reaped end of November. Yield 250 lbs. grain. I consider it well suited to the dis-

strict and will pay well. I may remark that if we had our usual rain the crop would lie down, so am of opinion that it should not be sown on too rich soil or too thickly.

Albany.—Mr. A. J. Daniel. No date given. Result: Indifferent. This barley does not yield as well as the old Boer barley.

Peddie.—Mr. C. S. Dell. Sown 16th August. Result: Good. Sown very late on unirrigated, heavy, red sandy soil, fallowed previous to sowing. Reaped 7th December, 1909. Yield 150 lbs.; no manures. I consider suitable if grown in sheltered spot. It was not attacked by disease.

Hanover.—Mr. V. Thiebert. Sown 28th July, 1909. Result: Good. Sown early on irrigated land; no treatment after sowing. Very dry (drought) and several severe frosts; no manure applied; reaped 24th December, 1909. Yield 300 lbs. Very suitable for district and will pay well. It is a splendid barley for green food for horses, etc., and can be fed up to two weeks previous to being reaped. It loses its beard when ripe, and has very fat "pits"; a great improvement on our local mixture. I consider April and May the best time to sow in this district.

APPLER OATS.

Twenty-one reports of this variety have been received. The majority show very good results, in fact some are highly satisfactory, and indulge in laudatory remarks upon the virtues of this oat, which is fast becoming a great favourite.

Hope Town.—Mr. J. C. Visagie. Sown 26th May, 1909. Result: Good. Sown in due time. A very good oat; stools splendidly; reaped 44 bundles averaging 6 lbs. each. Well suited to district.

Bedford.—Mr. Wilfred Mapham. Sown 13th May, 1909. Result: Failure. Owing to drought seed germinated and then suddenly died off. This also happened to some English barley sown alongside.

Piquetberg.—Mr. E. J. M. Schenk. Sown 11th June, 1909. Result: Good. Sown late on unirrigated, good, loose, gravelly soil. Applied 25 lbs. superphosphate and 25 lbs. basic slag. Reaped 200 lbs. "oathay." Is suitable and will pay if sown early.

Cathcart.—Mrs. T. F. Miller. Sown 12th June. Result: Good "Beautiful" oats; will decidedly pay. Reaped 20 1. Stools well and stands drought well.

Mr. W. F. Hall. Sown September 20th, 1908. Result: Good. Sown very late; yield 40—1. Splendid oats; very suitable and will pay. Have sown the 400 lbs. this season and will report later on again.

Venterstad.—Mr. F. L. Fossate. Sown 11th August, 1909. Result: Good. Sown in good time; reaped 15th December, 1909. Yield 15—1. It is suitable and will pay. Weather very dry; no rain. Irrigated four times.

Lower Paarl.—Mr. W. H. van der Spuy. Sown 31st May. Result: Good. Sown due time. Reaped November 9th, 1909. Yield 6—1. Applied one bag guano mixed with bag kraal manure. Suitable and will pay.

East London.—Mr. C. Dredge. Sown 15th June, 1909. Result: Failure. Destroyed by locusts.

Mr. R. Wakeford. Sown 10th August, 1909. Result: Good. Sown late. Reaped December; yield 10—1. It is very suitable and will pay. Weather very dry during growth.

Griqualand East.—Mr. W. A. Hart. Sown 2nd August, 1908. Result: Good. Sown very late; reaped first week in January, 1910. Yield 13 to 1. Weather very dry during growth. It grew better than any local oats. Is suitable and will pay.

Komgha.—Mr. A. M. C. Kaschula. Sown 25th June, 1909. Result: Good. Sown on unirrigated black soil. Reaped 7th December, 1909; yield 13 lbs. It is very suitable and will pay very well. Weather very dry during growth.

Port Elizabeth.—Mr. A. H. Mobbs. Sown September 1st, 1909. Result: Failure. Failure owing to drought.

Adelaide.—Mr. F. J. Nel. Sown 12th June, 1909. Result: Indifferent. Sown due time, thickly, on irrigated, rich soil; applied no manure. Reaped 3rd December, 1909. Yield 50—1. It is not rust-proof and is not the "proof" that I am trying to get hold of.

Xalanga.—Mr. J. Costello. Sown 10th June, 1909. Result: Good. Sowed thickly on unirrigated soil. Weather very dry during growth; only had one rain in September. Reaped on the 8th December, 1909. Yield 10 to 1. I consider it is suitable in every way and will pay.

Bredasdorp.—Ohlsson's Potteberg Farms. Result: Failure. Failure owing to drought.

Piquetberg.—Mr. P. Mosel. Sown 1st June, 1909. Result: Good. This oat, like the Texas, is very good indeed, and I am exceedingly glad to have an opportunity of trying it. I reaped 11 to 1 on the 7th December, 1909. It should also be sown early, and will then withstand the drought better.

Elliot.—Mr. E. J. Marillier. Sown 27th May, 1909. Result: Failure. Failure owing to drought.

Mr. J. Hart. No date given. Result: Failure owing to drought.

Grahamstown.—Mr. J. W. Staples. Sown August. Result: Good. Sown rather late. Reaped in December; yield 33—1. Very suitable for district and will pay well.

Bathurst.—Mr. J. B. Wilson. Sown 17th September, 1909. Result: Failure. Destroyed by rust. Not suitable.

Oudtshoorn.—Mr. W. J. Northcott. Sown 23rd July, 1909. Result: Good. Sown two months too late. I consider it a very good oat, but should be sown in May to ripen about October. Reaped December 29th; yield 9½ to 1.

WHITE DANISH OATS.

Only eight reports have been received on this variety. Only two are good, two indifferent and four failures due to rust, frost, drought and locusts.

Peddie.—Mr. C. S. Dell. Sown 16th August, 1909. Result: Failure. Sown late on unirrigated, red, sandy soil. No manure; no yield. Weather dry. Took rust two weeks after coming up and a month after was completely dead. Not suitable by any means and won't pay. This was the worst case of rust I have ever seen in this district and consider this oat a complete failure.

Victoria West.—Mr. J. B. Kemfer. Sown May 18th, 1909. Result: Failure. Sown early, thickly, on irrigated, rich soil. Reaped on 12th December, 1909; yield 126 lbs. Half killed by frost in June. Not suitable and will not pay.

Alexandria.—Mr. C. van Rensburg, Junr. Sown August 20th, 1909. Result: Failure. Owing to drought this was a failure.

Albany.—Mr. A. J. Daniell. Sown 17th August, 1909. Result: Indifferent. Sown late; unirrigated. Weather very dry. No manure. Rust attacked it when very young. Reaped 10th January, 1910. Yield 270 lbs. If rust does not attack it it may answer.

Stutterheim.—Mr. C. H. Kaschula. Sown 3rd September, 1909. Result: Good. Sown very late on unirrigated, sandy soil. It was attacked by rust on the 26th December, 1909. Reaped January 20th, 1909. Yield 175 lbs. It is suitable and will pay, but must be sown earlier.

Grigoland East.—Mr. H. Swarne. Sown June, 1909. Result: Failure. Destroyed by locusts.

Xalanga.—Mr. T. Costello. Sown June 10th, 1909. Result: Indifferent. This oat is too coarse in the straw to sell as forage.

Grigoland East.—Mr. W. Widdicombe. Sown June 20th, 1909. Result: Good. Destroyed by locusts just before reaping. It is suitable and will pay.

ALGERIAN OATS.

Nine reports on this variety have been received. Six are good, two indifferent and one failure due to locusts.

Middleburg, C.C.—Mr. J. W. Staples. Sown August, 1909. Result: Good. Sown rather late. Reaped in December. Yield 330 lbs. Very suitable for district and will pay well.

Lower Paarl.—Mr. W. R. van der Spuy. Sown May 31st, 1909. Result: Good. Sown right time, thinly, on unirrigated, fertile soil. No treatment after sowing. Reaped November 9th, 1909. Yield 60 lbs. I consider it suitable and will pay.

Malmesbury.—Mr. S. Walters. Sown 1st June, 1909. Result: Indifferent. Sown thinly in due time on unirrigated, dusty, sandy soil; very little clay. Weather dry till August; dry and windy till September; otherwise favourable. Reaped 20th November. Yield 52 "sheaves" (not weighed). I consider suitable and will pay, but will not sow again because straw is too coarse, and husk too thick; consequently weight not good, and it is not good for hay.

East London.—Mr. T. H. Dredge. Sown 9th September, 1909. Result: Indifferent. Sown late; reaped 7th January, 1910; yield 105 lbs.; grew well the first two months and after that looked bad. It ought to be sown earlier.

Mr. W. Kellet. Sown June 10th, 1909. Result: Failure. Grew very well, but all eaten off by locusts.

Elliot.—Messrs. Davis Bros. Sown 21st June, 1909. Result: Good. Sown 18th December, 1909. Weather extremely dry. I consider it very good and will pay. But for the severe drought the yield would have been very good.

Grahamstown.—Mr. J. B. Wilson. Sown 17th September, 1909. Result: Good. Sowed rather late on black, sandy soil; no manure; unirrigated. Reaped January 15th, 1910; yield 1,000 lbs. oathay. It is suitable and will pay. It is a good, heavy oat.

Fraserburg.—Mr. D. Hodgson. Sown 5th October, 1909. Result: Good. Sowed rather late on irrigated land. Hardly had any rain during growth. Applied 12 mud bags to the plot of 100 square yards. Virgin soil, inclined to be brackish. Reaped 20th January, 1910. Yield 300 lbs. It grows very luxuriantly with stems inclined towards coarseness, which may be on account of being sown late.

Tullagh.—Messrs. Z. G. & D. J. du Plessis. Sown 21st June, 1909. Result: good. Sown late on unirrigated, sandy soil; did not weigh yield. It is drought-resisting and in every way suitable to district and will pay.

TEXAS OATS.

Twenty-one reports on this variety have been received. Thirteen are good, two indifferent and six failures. Of these latter two are due to rust, three to drought and one to locusts.

Bredasdorp.—Ohlsson's Potteberg Farms. Result: Failure. Failure owing to drought.

Mr. H. C. Goldie. Sown 5th June. Result: Good. Very good cropper; the yield was 13 bushels, 65 bags from one bag of 150 lbs. I sowed it late. No treatment; weather was very dry; 50 lbs. superphosphate applied. It is suitable and will pay.

Grahamstown.—Mr. J. B. Wilson. Sown 17th September, 1909. Result: Failure. Destroyed by rust.

Mr. L. B. Webber. Sown 18th August, 1909. Result: Good. Sown very late on unirrigated, dark red soil; no manures. Slightly attacked by rust. During first part of growth weather was wet; last part dry. Reaped in December; yield 100 lbs. Suitable and will pay. Birds destroyed a large quantity, otherwise yield would have been greater.

Mr. J. W. Staples. Sown August. Result: Good. Sown rather late on half red, sandy soil, unirrigated. Reaped in December. Yield 330 lbs. Very suitable for district and will pay well.

Hope Town.—Mr. J. G. Visagie. Sown May 26th, 1909. Result: Good. Sown in due time on unirrigated land, medium thickness, red, sandy soil. No treatment after sowing; no manure. Reaped November 9th, 1909. Yield 40 bundles, weighing 240 lbs. Very suitable and will pay. It is very similar to Appler oats.

Elliot.—Mr. J. Hart. No date given. Result: Failure. Owing to drought was a failure.

Humansdorp.—Mr. James Young. Sown May 22nd. Result: Good. Sown proper time on red soil, irrigated three times. Applied half wagon load kraal manure; reaped 10th November, 1909. Yield 400 lbs. Suitable and will pay.

Piquetberg.—Mr. E. J. M. Schenk. Sown 11th June, 1909. Result: Indifferent. I do not consider this to be as good as Algerian; nevertheless, I think it will pay, and ought to be sown early. I reaped 200 lbs. oathay.

Stellenbosch.—Mr. A. Kennedy. Sown early June. Result: Good. Very suitable for district and will pay. It got mixed up with other crops, so cannot say what yield was. Grew splendidly.

Griqualand East.—Mr. W. Widdicombe. Sown 20th June, 1909. Result: Good. The oats grew to perfection, but were eaten by locusts just when I was about to commence reaping. It is suitable and will pay.

Fraserburg.—Mr. N. F. Hodgson. Sown August 6th, 1909. Result: Failure. Sown on unirrigated land. Owing to drought it was a failure.

Xalanga.—Mr. T. Costello. Sown 10th June, 1909. Result: Good. Sown late on unirrigated, loamy soil; no treatment and no manure. Reaped 8th December, 1909. Yield 125 lbs. "grain." It is very suitable and will pay.

Hanover.—Mr. H. Thiebert. Sown 14th July, 1909. Result: Failure. Had to sacrifice the crop by spraying with locust poison to prevent further inroad upon remainder of crops.

Aliwal North.—Mr. A. W. Higgins. Sown 3rd July, 1909. Result: Good. Sown early. Reaped December 3rd, 1909; yield 210 lbs. grain. I think this a very good oat for forage. It is fine in the straw and bright and clean looking in bundles. I damped the seed and coated same with lime before sowing.

Adelaide.—Mr. F. J. Nel. Sown 12th June, 1909. Result: Indifferent. Sown right time; irrigated when necessary. Rich, sandy soil; no manure; weather dry. Attacked by rust before ripening. Reaped December; yield 900 lbs., including straw. Will pay if no other obtainable.

East London.—Mr. S. W. Dredge. Sown 13th July, 1909. Result: Good. Sown early on unirrigated, sandy loam soil. Grew well, but was destroyed by locusts just before reaping. I think it suitable and will pay.

Cathcart.—Mrs. T. F. Miller. Sown June 12th, 1909. Result: Good. Sown right time on irrigated, sandy soil; cultivated and harrowed twice. Reaped December 27th, 1909. Yield 40 bales 132 lbs. Had four inches rain. Very suitable for district. Stools well and weighs well.

Graaff-Reinet.—Mr. G. B. Smith. Sown July, 1909. Result: Failure. Sowed broadcast, thinly; soil a stiff, red clay. Reaped in January, 1910. Yield very poor owing to drought. I will sow a bag of this seed next season to give it a fair trial.

Piquetberg.—Mr. P. Mosel. Sown 1st June, 1909. Result: Good. Sown too late for these parts on yellow soil; kraal manure applied. Reaped 7th December, 1909; yield 115 lbs. It is an exceptionally good oat and can be very strongly recommended. It should be sown early.

Swellendam.—Mr. H. O. Eksteen. Sown July 20th. Result: Good. Sown late on unirrigated *zuur veld* soil. Applied 10 lbs. guano. Weather very dry. Reaped 1st December, 1909. Yield 225 lbs. Very suitable for district and will pay.

WHITE CANADIAN OATS.

Only ten reports have been received on this variety up to date. Two are good, two are indifferent, five are failures due to various causes, and one report says the crop was still standing and a further report will be favoured at a later date.

Tembuland.—Mr. P. C. le Roux. Sown June 5th. Result: Good. Sown early, unirrigated land, 198 ft. x 57 ft.; no manure applied; reaped December 18th; yield 180 lbs. Weather very dry during spring; rain last two weeks in December. Very suitable and will pay.

Cathcart.—Mr. W. F. Hall. Sown September 15th. Result: Good. 20 lbs. sown late; unirrigated; $\frac{1}{2}$ acre; red loam soil. Reaped 21st January, 1909; yield 350 lbs. Decidedly suitable and will pay.

Dordrecht.—Mr. H. P. van Rensburg. Result: Failure. Completely destroyed by late frost.

Humansdorp.—Mr. A. G. Dassonville. Sown 20th August, 1909. Result: Indifferent. We had a very bad season, so cannot give a fair opinion.

Mr. J. G. du Bruin. No date given. Result: Failure. Seed was blown away by violent wind storms.

Calvinia.—Mr. J. W. Louw. Sown 15th July, 1909. Result: Failure. I will not sow this again as it falls out just as soon as it begins to ripen.

Fraserburg.—Mr. C. V. de Villiers. Sown 27th December, 1909. Will report again later on. Sown very late. It is still growing (5/3/10). If sown early I think it will prove to be a first-class oat.

Vitenhage.—Mr. F. Bowker. Sown September 15th, 1909. Result: Failure. Drought.

Uniondale.—Mr. D. Keyser (D. son). Sown August 15th, 1909. Result: Indifferent. The ground here is too rich for oats; they grew too luxuriantly. (?)

Pulbagh.—Messrs. Z. G. & D. J. du Plessis. Sown 21st June, 1909. Result: Failure. This seed was mostly unsatisfactory, it being mixed with a large percentage of foreign seed. It is not as drought-resisting as the Algerian.

EAST COAST FEVER.

STATEMENT OF MEASURES TAKEN TO SAFEGUARD THE COLONY OF THE CAPE OF GOOD HOPE AGAINST THE INTRODUCTION OF EAST COAST FEVER FROM THE ADJOINING COLONIES OF NATAL AND TRANSVAAL.

The following is a resumé of the steps which have been taken by the Government for safeguarding this Colony against the introduction of East Coast Fever from the adjoining Colonies of Natal and Transvaal.

Guarding of Borders.—Cape-Bechuanaland Protectorate Border (about 300 miles).—Guarded and patrolled between Ramathlabama and Kuis by 19 C.M.P. and 3 Native Detectives. Camps established at Ramathlabama, Pitsani, Tsedilomolomo, Packenham, Detlaraping and Morokwen.

Cape-Transvaal Border (about 262 miles).—Guarded and patrolled by 34 C.M.P. and 1 Detective. Camps are established at Christiana Gate, Thornhill, Kopje Enkel, Home Rule, Pudimoe, Malalaring, Mosymiyani, Broeders Puts, Welverdiend, Rosaquali, Kraaipan, Maritzani Eye, Rietfontein, Rooigrond, Malmani Road and Ramathlabama.

Cape-Natal Border (about 330 miles).—Guarded and patrolled by 109 C.M.R. and 220 Natives. Three special Native Detectives are also employed in each of the Districts of Umzimkulu and Bizana. Camps are established at Bonnyvale, Stanford's Drift, Brighton, Middleton, Riverside, Railway Camp, Arnold's Drift, Waterfall, Umfulamuhla, Union Bridge, Stranger's Rest, Middleford, Gloucester, Iron Latch, Gugweni Gate, Harding Gate, Staffords Gate, Ingeli Gate, Amanzimyama, Boshof's Drift, Owen's Camp, Mjika Camp, Webster's Drift, Davies' Camp, Impindweni, Lugie, Middledrift, Gunther's Camp, Clark's Camp, Leecon Camp and Umtamvuna Mouth.

An inspection of the Cape Colony-Protectorate Border near Kuis (the most westerly point guarded by this Government), made by the local sub-inspector of the C.M.P., indicated the advisability of stationing men in the vicinity of Kuis and Madebing, and mounting them on camels, as, owing to the long distances to be traversed and the scarcity of water, supervision on horseback was out of the question. Three camels have been purchased for this purpose. Fencing of this border is not considered necessary at the present time.

Border Fences.—The frequency with which repairs of the Transvaal Border fence were needed suggested a thorough inspection of this fence. As a result it was found necessary to overhaul the whole line of fence, which consists in part of four and five wires only. The strengthening of the fence is now completed, the fence consisting of five wires and upwards throughout, except where the standards, being driven into hard, rocky ground, could not be raised so as to carry an additional wire to bring the fence up to the desired height of 4 feet 6 inches. No advantage would have been gained by making these particular sections of the fence a six strand one, as it would have necessitated at least two of the wires being placed within an inch or two of each other, and even then would not have reached the desired height or in any way added to the efficacy of this section for keeping cattle out.

In those sections of the fence carrying seven wires, the extra strand has been inserted by the owner of the farm which the fence traversed in order to render it proof against small stock.

All additional and renewed wires are barbed and all unsound poles have been replaced with iron standards.

On the Natal Border the fence erected for Rinderpest purposes having been in existence from the Drakensberg to Boshoff's Drift and since repaired, it was only necessary, in order to complete the fencing of the whole of the border, to erect the section from Boshoff's Drift to the sea. This was completed at the end of September, 1908. In the beginning of 1908 considerable pressure was brought to bear in favour of a clear zone along the entire border, and a belt of 800 yards was established, from which all cattle were excluded except cattle to be milked or yoked and those used for the cultivation or removal of produce and transport of goods from the Ports of Entry in that section of the zone extending from the Basutoland border to Ingeli. This was, however, found to be impracticable and also likely to alienate the border farmers in so far as the section from the Drakensberg to the confluence of the Umzimkulu and Ibisi Rivers (about one-half of the border) was concerned; and to that extent the belt was accordingly withdrawn. The same reasons applied also to the portion of the border north of Alfred County; but as this section had not the advantage of a river frontage, it was deemed advisable to erect a double fence about 50 yards from the then existing fence along this extent (about 50 miles), and upon completion of the fence, in August, the 800 yards belt along this section also was withdrawn. Meanwhile, an inspection of portions of the fence along the Umzimkulu River indicated that the fence from the Drakensberg to the junction of the Umzimkulu and Ibisi Rivers (170 miles) needed overhauling. In some parts silt and rubbish having washed up against the fence to a height of 2 feet, thus lowering it to only 2½ feet. Immediate steps were, therefore, taken to effect these repairs, at a cost of about £2,700, the fence being at the same time heightened to 5 feet 6 inches in those parts where the configuration of the ground rendered a height of 4 feet 6 inches inadequate.

Restrictions.—The following are those at present in force:—

- (a) From Natal no cattle, equines, animal produce (except frozen meat consigned direct to Cape Ports *oversea*), grass, hay, reeds, rushes, herbs, plants (other than cultivated ones) or other vegetable matter, including any receptacles containing the same, can be introduced. Through Stanford's Drift and Union Bridge only human beings and articles not specially prohibited are now admitted. Through Riverside articles which are not conveyed in cattle trucks are admitted by rail only. This Port is also open for human beings and their personal effects. Ingeli and Harding Gates are open only for human beings and their personal effects and mail bags. Mail bags only can be brought into Pondoland through Webster's Drift under the supervision of the Border Guard.
- (b) From the Transvaal the introduction of cattle, grass, hay, reeds, rushes, cattle manure, and *green* hides, skins and horns is prohibited. Vehicles drawn by equines can cross the border at any gate, but those drawn to the border by cattle can only enter at Rooigrond and Mosymiyani after being outspanned on the Transvaal side, whence they are drawn across the border by mules. Oxen in yoke only, hauling transport wagons, are, however, now permitted to proceed from the Transvaal Border to Maribogo Siding by way of the road which has been specially

fenced for the purpose and is only used between sunrise and sunset, provided such oxen are not outspanned within the fenced area, but return, after delivery of their load at Maribogo Siding, to the Transvaal. Dry hides, skins and horns have to be properly cured and dressed, and to be accompanied by a certificate by the Principal Veterinary Surgeon of the Transvaal to this effect. Wool and mohair must be properly baled and come direct to a railway station between Mafeking and Fourteen Streams for consignment to a port without being opened *en route*.

- (c) From the Bechuanaland Protectorate the introduction of all cattle other than slaughter stock is prohibited, and slaughter stock have to be dipped under supervision at Ramathlabama before they enter.
- (d) From Rhodesia the introduction of cattle, grass, hay, reeds, rushes, and *green* hides, skins and horns is prohibited. Dry hides, skins and horns can enter only under the same conditions as in the case of the Transvaal.
- (e) From the coast north of Durban the introduction of cattle, sheep, goats, buffaloes and antelopes is prohibited. Hides, skins and horns from Portuguese East Africa are now subject to the same restrictions as those from Rhodesia.

The grazing or depasturing of any horned cattle on the land lying between the Ingwangwane, Indowana, Umzimkulu and Umtamvuna Rivers and the Border Fences is prohibited under penalty of immediate destruction without compensation, while the removal from the same area of grass, hay, rushes, reeds, herbs, plants and other vegetable matter liable to carry ticks is also prohibited.

The importation into or removal from place to place within the Transkeian Territories, with intent to spread East Coast Fever, of any animal or portion of the carcass of any animal or any articles or things which, either by contact with any affected animal or through any other means, are liable or capable or have been rendered capable of transmitting the disease is prohibited under a penalty of £500 or seven years' imprisonment, or both such fine and imprisonment.

An Advisory Board, composed of Europeans and Natives, to assist the local Magistrate, has been formed at Umzimkulu. This Board has been of considerable assistance to the Department, and has been the means of establishing a system of co-operation between the Government and the local people.

Eleven men have been specially appointed for the purpose of repairing any breaks which may occur in the fence along the Natal Border. These men move constantly up and down the fence, each taking a defined section, and at the same time do the duty of guards, while 84 additional Natives have been specially engaged to guard the drifts across the Umzimkulu and Umtavuna Rivers to prevent cattle being smuggled across at night. Twelve extra guards have also been engaged on the land boundary between the Ingeli and the junction of the Ibisi and Umzimkulu Rivers, and also ten between Cabane and Riverside.

Depots have also been established at Riverside, Umzimkulu, Bizana and Port St. John's, where an emergency stock of fencing materials has been stored to enable the Government to cope without delay with any outbreak, in the event of the disease crossing the Border.

Two Veterinary Surgeons have been specially stationed at Umzimkulu and Bizana for examining outbreaks of disease on the border both in this Colony and in Natal territory, for the purpose of identifying the nature of the disease.

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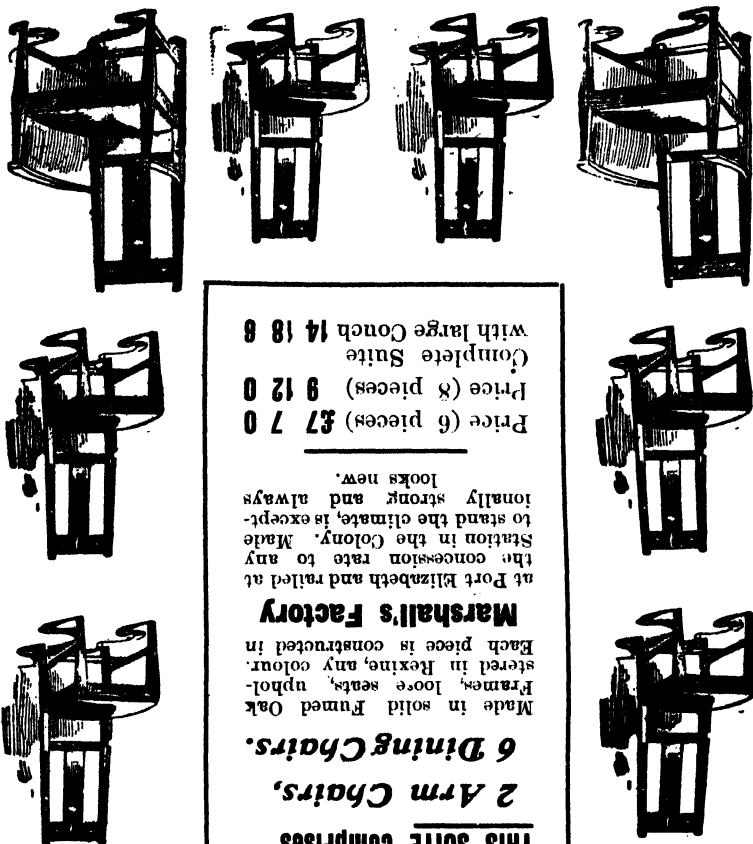
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BONES & HORN PITHS

WANTED

1910. To be kept the same way as the birds—only of course on different prices.

HORSES.																					
Births.		Deaths.		Horses																	
				Fowls.		Lost.		Sold.		£ s. d.		Bought		£ s. d.		Total		Remarks.			
1910.	Jan. 31	20	1	5	2	10	50	0	0	2	100	0	0	200	Feb.	212	Mar.	196	..	1910.	
	28	30	3	8	1	..	..	..	..	..	..	..	..	..	100 birds to be pulled.	50 quills.	100 birds to be pulled.	6 birds to be pulled.	..		
	31	10	1	3	2	20	80	0	0	..	..	..	..	..	..	..	..	..	..		
		60	5	16	5	30	130	0	0	2	100	0	0	..	..	..	..	..	..		
BIRDS, CHICKS, LOSE.																					
Births.		Deaths.		Total Dec. 31st, 1910.						Total						Remarks.					
				Lost.		Sold.		£ s. d.		Bought		£ s. d.		Total							
1910.	Jan. 31	20	1	5	2	10	50	0	0	2	100	0	0	200	Feb.	212	Mar.	196	..	1910.	
	28	30	3	8	1	..	..	..	..	..	..	..	..	..	100 birds to be pulled.	50 quills.	100 birds to be pulled.	6 birds to be pulled.	..		
	31	10	1	3	2	20	80	0	0	..	..	..	..	..	..	..	..	..	..		
		60	5	16	5	30	130	0	0	2	100	0	0	..	..	..	..	..	..		

Births.	Deaths.	Total Dec. 31st, 1909-10.							Remarks.
		Total	£ s. d.	Bought	£ s. d.	Sold.	Lost.	Sheep, Lambs Killed.	
1910. Jan 31	..	2	..	12	2	..	..	803	4 Rams put to ewes.
Feb. 28	4	1	..	11	..	100	01 2 0	785	1 Ram taken out.
Mar. 31	88	1	2	12	1	..	..	850	..
Dec. 31	..	..	..	16	1	..	..	..	..
1910.	92	4	2	57	4	100	01 2 0	..	..

This will do for Sheep, Cattle or Goats.

Carlisle Bridge, 2nd May, 1910.

FARMER.

Of course I use a pocket-book for every day use, and at the end of each month I make up my book. I am sending you a specimen in case you think it worth noting.
 I use two pages for each branch of stock, on the one side a detailed amount of the stock and the opposite side is used for remarks.—Yours, etc.

Special Legislation (Act No. 17 of 1908 and Proclamation No. 131* of 1909) has been passed giving full powers for dealing with any outbreak of East Coast Fever, and the Department is, therefore, in the position to take prompt measures whenever necessary to do so.

The Government has determined to adopt a policy of clearing the districts which border on Natal as far as possible of ticks, and with this object in view, is adopting the following measures, viz.:—

1. Dividing fences between the Lower Locations in the Umzimkulu District and the adjoining properties have been erected.
2. A new fence has been erected from Brooks Nek through Pondo-land to the coast, in the event of the necessity hereafter arising for providing a further line of defence. Arrangements are also being made for putting No. 3 fence from Ingeli to Umzimvubu River in a state of thorough repair.
3. Nine additional cattle dipping tanks are being constructed in the Bizana District; eight additional in Umzimkulu; three additional in Mount Ayliff, and one in Matatiele—all to serve the purpose of dipping cattle owned by Natives, and periodical dipping will be made compulsory in those Districts as soon as the tanks are completed.
4. Stock Inspectors have been appointed by the Government for the following Districts, viz.:—
 Umzimkulu (2).
 Bizana (2)
 Mount Currie and Mount Ayliff (1).
5. Supervision of dipping will be provided and dip supplied (a) at cost of owners in European areas; (b) at the cost of the Council in District Council areas, and (c) out of the proceeds of a special tax of 2s. 6d. which will be re-imposed in non-Council Native areas.
6. The offer of monetary grants on the £ for £ principle in aid of the construction of cattle dipping tanks has been withdrawn, and is being superseded by a system of advancing loans from public funds subject to repayment with interest in annual instalments.

As a further precautionary measure, the Districts of Bizana and Umzimkulu have already been proclaimed "suspected" districts, from or into or within which the removal of any horned cattle is regulated by Proclamations Nos. 461 and 462 of 1909 respectively. Transport wagons and goods from adjoining districts of this Colony are only admitted into the Bizana District through Nqabeni Drift, where they are hauled across by a steel cable after the oxen drawing them have been outspanned on the Flagstaff side of the boundary. Sixty Native Guards under the charge of three C.M.R. have been engaged to guard all drifts where cattle may cross or be illicitly introduced, and to patrol the boundary, whilst the Headmen of the Border Locations are also being granted a small monthly allowance in consideration of their rendering similar assistance. Any cattle which may be introduced into the Bizana and Umzimkulu Districts from adjoining districts, in contravention of the Regulations will be impounded by the Headman of the Location in which they are found and isolated as completely as circumstances permit pending an enquiry by the Resident Magistrate and instructions as to their disposal. It may be added that only human beings on foot with their personal effects are permitted to cross the border from Bizana into Natal, and then only through Middledrift.

Owners of farms in the Umzimkulu District who own farms contiguous thereto but situate in an adjoining district, e.g. Mount Currie, are, however, permitted to move their cattle to such contiguous farms (*but not to farms owned by them contiguous to the latter*), and *vice versa*, provided such cattle are not removed beyond the boundary of their farms in the adjoining District.

On the 31st March a case of East Coast Fever was diagnosed among some cattle grazing on the Umzimkulu Village Commonage. The only infected animal, a cow, the property of the local constable, had been three years in the village, so it is more than difficult to conjecture how the infection was contracted. The case was discovered by Veterinary Surgeon Spreull. On the matter being reported the affected animal was forthwith destroyed, as well as 303 animals, which were treated as in-contacts. The infected area was promptly quarantined, also the major portion of the Umzimkulu district abutting on the Natal border, and extending from Riverside to Harding Gate, which is fenced and guarded. No movement of horned cattle is permitted from or into, or from any one farm, native location, forest reserve, outspan, or commonage, to any other such place within the quarantined area. The Government, in a word, is putting forth every endeavour to arrest the spread of the disease, and although it has crossed our borders, there is still hope that it may be brought under control.

CATTLE DIPPING.

The Cattle Cleansing Act, No. 31 of 1908, as amended by Act No. 43 of 1909, enacts legislation for preventing the spread of ticks by the removal of cattle. The main provisions of the Act are that tick-infested cattle may not be on any main, divisional or municipal road, nor on any public outspan or commonage, unless they have been cleansed within 14 days, or are proceeding direct to a dipping tank not more than 10 miles from the place of removal, and they must be under the control of a competent person. This does not, however, apply to cattle of persons within the boundaries of their properties. Cattle on such a road or place may be inspected by a Field Cornet, Justice of the Peace, Sheep Inspector, Police Officer or Inspector appointed *ad hoc* by a Divisional Council, any of whom may demand to see the certificate, or permit, required by the Acts. These Officers are also enjoined, if the certificate or permit be not forthcoming, to cause the cattle to be cleansed at the cost of the owner.

By Proclamation No. 11 of 1910, the term "cleansed" is defined and the form of certificate required prescribed.

The Act has been proclaimed in force in the Divisions of East London, Bathurst, King William's Town, Komgha, Albany, Port Elizabeth, Fort Beaufort, Alexandria, Cathcart, Victoria East, Stutterheim and Peddie. It leaves Divisional Councils to decide whether it shall be enforced in their divisions or not.

Fair progress has been made in regard to the construction of cattle dipping tanks, which are distributed as follows:—

LIST OF PUBLIC AND PRIVATE DIPPING TANKS.

District.	Public Tanks.	Private Tanks.
Albany	Grahamstown	Mount View, Manly Flats, Jericho, Thorneycroft, Glen Boyd, Ballinafad, Southey's Hoek, Ashtondale, Ward Vale, Clay Pits, Frazer's Camp, Bucklands, Crosslands, Hebron, Sweet Kloof, Pleasant Prospect, Mount Pleasant, Woodlands, Middleton, Ellende, Schmit Kop, Woodberry, Retreat.

<i>District.</i>	<i>Public Tanks.</i>	<i>Private Tanks.</i>
Alexandria	Alexandria Commonage, Paterson Commonage, Graaff Water, Doornkloof.	Hopfield, Leeuwenbosch, Bushy Park, Hilary, Bluegum Villa, Sea View, De Grip, Thornhill.
Adelaide	...	Saxfold Park, Elandshoek.
Bathurst	Round Hill Outspan, Brak River Outspan, Bathurst, Lime Ridge.	Greenfountain, Thornhill, Tharfield, Cuylerville, Rokeby Park, Summerhill Park, Kasouga West, Coombs.
Bedford	Klipplaat	Bellevue, Cullendale.
Butterworth	Butterworth Commonage.	...
Cathcart	Cathcart	Thomas River, Waku Valley, Middledrift, Ferndale, Rookin, Hopewell, Wellington, Cleete Dale.
East London	East Bank Location	Dreyer's Hoek, Prospect, Hillside, Elliottdale, Shelford, Ferndale, Amalinda, Farms 10 and 89 in Ward 5, Farms 154 and 113 in Ward 6, Gonubie Park, Lilyfontein.
Engcobo	Engcobo Commonage	Nil.
Fort Beaufort	Fort Beaufort, Yellowwoods Outspan.	Baddaford, Olive Cliff, Septer Manor, Rocklands, Rietfontein, Clifton, Botha's Post.
George	George Town, Diepkloof, Woodville.	Nil.
King William's Town	King William's Town, Berlin Commonage, Keiskama Hoek, Welcomewood.	Gray's Drift, Gobongo Park, Gonubie, Mowbray Park, Sparkington, Izeli.
Knysna	Knysna, Eastbrook, Westford.	Nil.
Komgha	Komgha Commonage	Lincoln, Kei Bridge, Stainland, Anxation, Mooi Plaats, Farm 267, Kwelera; Farm 292, Farm 287, Waterfall, Keikop, Ewanrigg, Lower Kuku, Lot 46, Westbury, Thorn Park, Denston.
Mount Currie	Herman	Fairview, Glen Dower.
Mqanduli	Mbozisa	Nil.
Nqamakwe	Blythswood	Nil.
Port Elizabeth	Port Elizabeth (in course of construction).	Bushy Park, Little Chelsea.
Peddie	-----	Pera, Gola Poort, Dunstan, Woolridge.
Stutterheim	Bolo Police Reserve	Cloverdale, Quetta, Wetherrun Waterford Estate, Woodridge.
Uitenhage	Glen Connor	Cuyler Manor, Perseverance, Prentice Kraal, Maitland River, Coega's Kop, Tankataru, Aloes.
Umtata	Umtata	Nil.
Umzimkulu	Umzimkulu, Lourdes, Riverside.	Sneezewood.
Victoria East	Alice, Calderwood	Alandale, Witney, Nottingham.

In addition to the foregoing, cattle dipping tanks, which are available for use by the public, have been constructed by the District Councils in the following Districts of the Transkeian Territories, viz.:—Elliotdale (1), Engcobo (2), Idutywa (1), Kentani (3), Mqanduli (2), Qumbu (1), Tsolo (1), Umtata (3), Umzimkulu (2), Willowvale (1), and Mount Ayliff (2).

In Pondoland 16 tanks have been completed, distributed as follows: Bizana, Libode and Ngqeleni, 3 each; Flagstaff, Lusikisiki and Tabankulu, 2 each; and Port St. John's, 1.

FRUIT EXPORT.

Return of Fruit Exported from Cape Colony during month of March, 1910.

Port of Shipment.	Destination.	No. of Packages.	Description of Fruit.	Quantities.	Value.
					£ s. d.
Cape Town ...	German South West Africa.	5	Sweetmelons	60	0 15 0
"	"	3	Watermelons	48	1 5 6
"	"	13	Peaches ...	3,420	8 7 6
"	"	3	Plums ...	600	1 12 6
"	"	15	Pineapples ...	1,100	6 2 7
"	"	2	Cocoa Nuts ...	50	0 8 4
"	"	22	Bananas ...	17,950	19 19 6
"	"	346	Pears ...	22,576	110 13 0
"	"	246	Apples ...	26,941	82 10 0
"	"	4	Lemons ...	912	3 11 0
"	"	14	Oranges ...	4,500	12 16 0
"	"	237	Grapes ...	9,494 lbs.	54 1 6
"	Walfish Bay	1	Grapes ...	22 lbs.	0 4 0
"	"	1	Bananas ...	36	0 2 6
"	"	1	Pears ...	36	0 3 0
"	Delagoa Bay	6	Peaches ...	144	2 0 0
"	"	5	Grapes ...	290 lbs.	1 4 0
"	"	1	Apples ...	1,200	0 10 0
"	Germany ...	1,047	Pears ...	30,630	164 1 0
"	"	353	Grapes ...	5,493	69 12 0
"	"	50	Peaches ...	1,500	7 10 0
"	"	50	Plums ...	1,500	5 0 0
"	France	18	Peaches ...	216	1 0 0
"	"	7	Grapes ...	49 lbs.	0 12 3
"	"	3	Pears ...	72	0 6 0
"	St. Helena...	2	Pines ...	225	1 2 6
"	"	2	Pears ...	228	0 11 6
"	"	8	Grapes ...	320 lbs.	2 8 0
"	"	4	Quinces ...	160	0 14 0
"	England	27,589	Grapes ...	364,343 lbs.	5,347 9 6
"	"	27,477	Pears ...	701,112	3,687 5 0
"	"	425	Melons ...	2,457	83 2 0
"	"	831	Peaches ...	20,509	105 11 3
"	"	4,166	Plums ...	112,355	417 10 0
"	"	66	Nectarines ...	1,965	10 8 0
"	"	16	Apples ...	550	3 17 0
"	"	18	Quinces ...	596	2 1 0
"	"	1	Pineapples ...	10	0 3 0
"	"	3	Pomegranates	180	0 10 0
"	"	386	Pineapples ...	4,620	67 0 0
"	"	33	Grapes ...	1,320 lbs.	13 0 0

CORRESPONDENCE.

Jackal Poison.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—We sent copies of the correspondence which appeared in your columns to the Manufacturers of Hulle's Strychnine Capsules who write us as follows:—

"We can only quote the old saying 'Imitation is the sincerest flattery' and with a deadly article such as strychnine we should imagine that most users would prefer to employ the safer form of a capsule, harmless to the touch and to handle rather than incur the risk and responsibility of manipulating and keeping loose strychnine on their premises."

Your correspondent, Mr. Van Zyl, of Poortje, is inclined to blame the manufacturer for the defective poison but if the farmers will use the only Hulle's Strychnine Capsules which is the original article complaints as to non-success will be a thing in the past. They are put up only in bottles of 50 capsules bearing a red label. Any other preparation purporting to be made "from" Hulle's Strychnine" is an imitation.—Yours, etc.,

HAYWARD, YOUNG & CO.

Port Elizabeth, May 3rd.

The Plague of Small Birds.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Mr. Blanckenberg of Roodekleigat, Malmesbury, refers to the ravages caused to grain-farmers by birds eating seed and asks what kind of poison should be used to destroy them.

For a couple of seasons we have been selling "Haywards Carbolyzed Grain Dressing" for the prevention of rust and smut in wheat, etc., and judging by the reports we have received from the grain districts in the Northern Colonies it appears to have given the utmost satisfaction. A dressing with this preparation will protect the seed from being destroyed by wire worm and grub and will make it unpalatable for birds. Any Western Province farmer who wishes further information can obtain same by application to us; meanwhile we enclose you a leaflet regarding the dressing and how to apply it.—Yours, etc.

HAYWARD, YOUNG & CO.

Port Elizabeth, May 3rd.

Pumping Tests on Boreholes.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I concur with the remarks of Mr. P. Joubert Viljoen, of Hanover Road, in the March issue of the *Agricultural Journal*, with regard to the insufficiency of pumping a borehole, during testing operations. The majority of drill foremen are of the opinion that a few hours' testing, is sufficient to enable them to correctly ascertain the yield of water from the borehole, and prove that it is inexhaustible. This is an erroneous idea, for the simple reason that a borehole may be capable of yielding a large supply when pumping for a few hours, but should a longer test be

carried out, it is found that the hole is very easily exhausted. Should the test be kept up continually without stopping for twenty-four or thirty-six hours, and a foreman finds he cannot decrease the yield, he can then assert that the hole is inexhaustible, with impunity.

I have been with several drill foremen while in the Public Works Department and have closely observed this method, having been strictly carried out, even though I found it rather unpleasant at times, but the farmers in each case have not been so grossly deluded by it, nor has it been found to give him a false hope, or could he prove that our statements regarding each borehole yielding a supply contradicting our statements. I have, nor bear, any prejudice against other drill foremen, but think, should they wish to be relied upon and trusted, they should always make it a point of thoroughly testing a borehole before they leave it, as in the majority of cases they cannot get back to give the hole another test, as the properties are so far apart. Of course, should a foreman once give a farmer an incorrect statement, he becomes sceptical, as regards his ability, as a driller. Care of the section of borehole and depth, as well as the yield must always be carefully calculated, and be absolutely correct, otherwise a farmer mistrusts the foreman in charge. This does not appertain to all drill foremen, but nevertheless there are always a few "land sharks" that spoil the opportunity of those who are better versed in the subject. Re the dykes or keerbanks I agree with him, especially dolerite, as these have been forced up in a molten mass, by volcanic action, have become solidified, and prevent water passing beyond it, as a dam wall does. Any perforation of this strata, or dolerite wall is like piercing a hole in a galvanized iron tank, with the result that the water squirts out. Therefore should a foreman be fortunate to strike a supply of water, when boring in dolerite, the yield is found inexhaustible. The piercing of such rock is difficult and very slow. I think a farmer should make a special contract with his foreman when this is the case, as a foreman has to keep up his staff of labourers, as well as the repairs to his machinery, and make a balance to clothe himself as well. By pumping for 24-36 hours duration, it enables a drill foreman to remove all the fine silt, that is likely to settle, and which will probably choke waterbearing fissures. Through the continual suction of the pump this matter is easily brought to the surface, and expelled.—Yours, etc.,

C. A. SCANLEN.

East London, 19th April, 1910.

Fishes and Dams.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In reply to the question of Mr. J. van der Walt I must say that no case is known to me of fishes being found in dams, which are not connected with a river, containing fish. Any river, connected with another river, which has fish, may get fish, as fishes go up-stream.

I know of a case in question, viz. that of the Molopo or Kalahari River, which once was in flood and it is now about 15 years since the river has been running. At this time there were thousands of fishes in the water. Since then the river has not been running, and the water of the large valley has dried up. Afterwards it has rained so that the valley got water, but there never was a fish in it. I am of opinion that no dam can obtain fish, but through a river. I could give other instances, but think it is not necessary.—Yours, etc.,

W. S. TURNER.

Thabies, Gordonia, 19th April, 1910.

Farmers' Stock Books.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—You have given us several specimens of how to keep a stock book—some in my opinion too elaborate, but the last not elaborate enough. With it, at the end of the year, you have no means of finding out the numbers of births, deaths, killed, bought, sold, etc., whereas with my way you can see at a glance.

NOTES ON THE WEATHER OF MARCH, 1910.

By CHARLES STEWART, B.Sc., Secretary to the Meteorological Commission.

A mean barometric pressure, considerably less than usual, cool days, with nights of average temperature; a marked absence of any pronounced warm periods; a notable persistence of Southerly winds, over practically the whole Colony; a mean rainfall slightly less than usual, a comparatively small number of thunderstorms; a high percentage of cloud within an increased frequency of fogs and mists; some sharp frosts; a few gales with a practical absence of hot winds and duststorms; these were the principal points in connection with the weather of March, 1910.

DIVISION.	Mean Rainfall (1910).	Mean No. of Days.	Average Rainfall (1891- 1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Average.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ...	2·57	4	1·54	2	+1·03	+ 67
South-West ...	2·06	4	0·84	3	+1·22	+145
West Coast ...	0·44	3	0·46	2	-0·02	- 4
South Coast ...	3·87	12	2·06	7	+1·81	+ 88
Southern Karoo ...	1·44	7	1·30	4	+0·14	+ 11
West Central Karoo ...	1·32	5	1·53	4	-0·21	- 14
East Central Karoo ...	0·94	5	2·42	7	-1·48	- 61
Northern Karoo ...	1·21	5	2·41	6	-1·20	- 50
Northern Border ...	1·58	5	2·85	7	-1·27	- 45
South-East ...	3·80	11	3·61	9	+0·19	+ 5
North-East ...	2·29	8	4·00	10	-1·71	- 43
Kaffraria ...	5·10	13	4·02	10	+1·08	+ 27
Basutoland ...	4·46	12	4·75	12	-0·29	- 5
Durban (Natal) ...	...	...	4·96	...	...	...
Bechuanaland ...	1·95	6	4·78	9	-2·83	- 59
Rhodesia ...	5·88	13	3·68	9	+2·20	+ 60

Precipitation.—The main rainfall during the month, deduced from the records of 337 stations amounted to 2·62 ins. on 8 days, being 0·07 in. or less than 3 per cent. below the normal. This mean is 1·51 ins. below the corresponding quantity in the previous month and 0·48 in. less than during March of 1909. From the accompanying table, it will be seen that a deficiency of precipitation was experienced over eight sections, the shortfall ranging from 59 per cent. over Bechuanaland to 4 per cent. over the West Coast. An excess of rainfall occurred over the rest of the country, mainly those districts near the coast in the South-West, South and South-East, as also in Kaffraria and Rhodesia. The surplus varied between 145 per cent. in the South-West and 5 per cent. in the South-East. Compared with the previous month, there was an increase of precipitation over the Cape Peninsula, South West, West Coast and Rhodesia, and a diminution of rainfall elsewhere; whereas, contrasted with March of 1909, the quantities registered were mostly smaller in amount, except over the South Coast, Kaffraria, Basutoland, and Rhodesia, where the rainfall was considerably greater this year. The rainfall, although deficient over half the divisions, was general over the country, not a single station of the 337 reporting 'Nil' for the month; 42 had 0·01—0·50 in.; 40 had 0·51—1·00 in.; 74 had 1·01—2 ins.; 63 had 2·01—3 ins.; 47

had 3.01—4 ins.; 32 had 4.01—5 ins.; 17 had 5.01—6 ins.; 9 had 6.01—7 ins.; 6 had 7.01—8 ins.; leaving seven (7) with over 8 ins.—viz. Willowvale, 8.09 ins.; Maclear, 8.67 ins.; Kentani, 9.40 ins.; Cwebe, 9.69 ins.; Grootvader's Bosch, 10.01 ins.; Bazeya, 10.30 ins.; and Evelyn Valley, 15.30 ins. An analysis of the maximum amounts recorded in the 24-hours periods shows that of 325 stations furnishing the necessary details, 98 had 0.01 to 0.50 in.; 90 had 0.51—1.00 in.; 96 had 1.01—2 ins.; 35 had 2.01—3 ins.; 2 had 3.01—4 ins.; four (4) had between 4 and 5 ins., viz. Chiselhurst, 4.02 ins. on 9th; Evelyn Valley, 4.21 ins. on 26th; Kimberley (Gaol) 4.22 ins., and Kimberley (Stephens), 4.35 ins., both on the 20th; whilst the maximum of 6.75 ins. was registered at Montagu on the 29th. *Thunderstorms* were much less frequent than usual, the number reported (314) being less than two-thirds that for March of the previous year and only about two-fifths that noted in February last. These storms were reported as occurring at one or more places on the first 29 days of the month, more particularly on 1st, 4th, 6th, 10th, 15th, 23rd, 27th, and 28th. During a thunderstorm which occurred on the afternoon of the 27th over the Cape Peninsula, some heavy falls in short intervals were experienced at Wynberg; viz. 2.35 p.m. to 2.55 p.m., 0.85 ins.; 2.55 p.m. to 3.15 p.m. 0.72 ins.; that is, 1.57 ins. in 40 minutes or at the rate of 2.35 ins. per hour; the total for the 24 hours was 2.89 ins. *Hail* fell at 18 stations on 10 days, principally the 6th and 10th; no damage reported. No *Snow* or *Sleet* noted during the month.

Although, generally speaking, the month was unusually dry the veld is reported as in excellent condition and all stock doing well.

Temperature, Cloud and Wind.—The mean monthly temperature of all stations was 66.7°, or 1.6° cooler than the previous month but 1.9° warmer than the corresponding month of last year. The mean maximum (76.1°) was 1.5° less than the preceding month but 1.4° more than in March of the previous year; similarly the mean minimum (57.4°) was 1.6° lower than in February last but 2.4° more than in the corresponding month of last year. A comparison with the normal values shows that the mean temperature of the month was 0.7° lower than usual, the defect being due to the day temperatures being 1.5° lower whereas the night temperatures were 0.2° higher than the corresponding averages. At the separate stations, the monthly mean was higher than usual in the West, South-West and a few places in the Cape Peninsula, as well as at the stations on the Northern Karoo and the High Veld, and at Main in Kaffraria, the excess being greatest (4.3°) at Hanover and least (0.1°) at Disa Head on Table Mountain. Over the greater part of the Cape Peninsula temperature was from about half-a-degree to two-and-a-half degrees lower than usual; all along the South Coast and inland to the Southern Karoo, it was mostly 2—3 degrees colder than usual, the deficit increasing to 3.8° at King William's Town but decreasing to about a degree in the South-East and Kaffraria,—rising to 1.9° at Hopefontain in Rhodesia. The maximum temperature was above the average at a few stations in the Peninsula, the South-West and on the Karoo, by 2—5 degrees the excess being greatest at Hanover; elsewhere there was a deficit commonly of 2—3 degrees but increasing to 4 and 5 degrees at a number of stations, and reaching 6.8° at King William's Town. At more than half the stations the mean minimum temperature was higher than usual, principally in the East and the interior although excesses were also met with at a few stations in the West and South-West and at Hopefontain; these *plus* amounts varied from 0.2° at the Royal Observatory to 3.0° at O'okiep. The nights were colder than usual commonly, by 1—2 degrees, along the South Coast, the deficit amounting to three degrees (3.0°) at the Devil's Peak (Table Mountain). The mean daily range was 18.7°, or one degree less than in March, 1909 but practically the same as last month. The mean warmest station was Kimberley with a temperature of 73.6°, and the mean coolest, Port Nolloth, with 59.6°, a difference of 14°. The highest mean maximum is that of Kimberley (87.6°) and the lowest mean minimum Chiselhurst (near East London) where it was 51.5°, Cathcart coming next with 51.8°. There seems to have been an unusual absence of any noteworthy spell of warm weather, the highest readings at the various stations being recorded over no fewer than 23 days of the months, 1st to 3rd, 5th, 12th, 14th, 15th, 17th., 18th, 21st to 27th, and on 31st, most numerous on 14th, 15th and 21st. The cool periods were much more defined, minima for the month being registered on 14 days, 2nd, 3rd, 14th, 17th, 21st, 24th, 25th and 28th to 31st, but most widely on the 31st and 20th. The mean value of the highest readings (83.8°) was 7.8° lower than in February and 3.9° less than in March of 1909, while the mean of the lower (46.7°) is 3° lower than in the preceding month and practically the same as in the corresponding month of the previous year. The mean monthly range was therefore only 37.1° as against 40.9° in the previous March and 41.9° during February last. The extreme values for the months were 105.6° at Dumbrody on 14th; while, curiously enough, the lowest temperature registered was 34.6° at Retreat in the Cape Peninsula on the 21st. The extreme monthly range over all stations was therefore 71.0°. Amalienstein was the only other station at which the maximum for the month reached 100° F. *Frosts* were noted as occurring at 15 stations on 7 days of the month principally 29th to 31st; these

caused slight damage to mealie and lucerne crops at Bethesda Road and more serious damage to mealies, pumpkins, etc., in vleis lands at Carnarvon Farm. The frost on the 18th at "The Lands" (Richmond) killed late crops and garden produce. At Retreat in the Cape Peninsula, the mean minimum temperature on grass was $51^{\circ}0'$ or 54° lower than the shade minimum; the temperature ranged from $59^{\circ}8'$ on 23rd to $26^{\circ}1'$ on 21st, the only occasion during the month on which it fell below freezing-point, damaging slightly the lower leaves of dahlias and tomato plants.

The mean amount of *Cloud* (54 per cent.) was high for the month, being 2 per cent. more than in February last and 5 per cent. higher than in the corresponding month of 1909. It averaged about 40 per cent. in the South-West, increasing to 54 per cent. along the South Coast and to 60 per cent. in the South East and Kaffraria; inland it decreased to between 45 and 50 per cent, whilst in the more northerly portions of the Colony it fell further to below 40 per cent. reaching the minimum of 19 per cent. at Mochudi; the greatest portion of sky obscured was 77 per cent. at Hopefontein, Dunbrody being next with 76 per cent. whilst at several other stations on or near the South Coast it exceeded 70 per cent. *Fogs and Mists* were of greater frequency during this month than during either February last or March of the previous year, 186 instances of this occurrence being noted on three days of the month, chiefly on 18th, 27th and 29th. The prevalent morning *Wind-direction* was Southerly (S.E. to S.W.) over practically the whole Colony but Westerly along the South Coast; easterly at Main in Kaffraria and N.E.ly at Mochudi. The mean *Force* on the Beaufort Scale was 1.86, corresponding to a velocity of 7.6 miles per hour or slightly less than last month and in March of 1909. The winds were strongest over the Cape Peninsula and the South West, decreasing Eastwards and inland to about one-third in the interior. The Royal Observatory records emphasize the unusual persistence of S.ly winds during the month, which were more pronounced than even during last March. These S. to S.E. winds blew on 25 out of the 31 days, a greater proportion than even during the summer months and were accompanied by the usual absence of rain. There was a marked absence of winds from the western half of the compass, except those from N.W. which blew on only four days of the month. The mean force there was slightly greater than usual, corresponding to a velocity of 8.6 miles per hour. No *Hot Winds* and only one (1) *Duststorm* was noted during the month. The wind was reported as attaining the strength of a *Gale* at 15 stations on 5 days particularly on 27th and 28th when an Easterly to Southerly gale was experienced along the South Coast, an unusual occurrence at this season of the year.

The mean pressure at the Royal Observatory was only 29.94 ins. or 0.04 in. less than usual; it ranged from 29.77 ins. on the evening of the 3rd to 30.30 ins. on the morning of the 19th.

OBSERVERS' NOTES.

VRUCHTBAAR (Wellington).—Extremely dry month, but for raisin curing and the gathering of grape crop, an ideal season.

PLEITENBERG BAY.—Weather very unsettled the whole month. Heavy gale from South-East on 27th.

UITENHAGE PARK.—A showery month, rainfall slightly over the average of past 8 years at this station (2.13). Gale from S.E. on 27th; unusual at this season.

BETHESDA ROAD.—Winter has set in early this year. Several sharp frosts occurring towards the end of the month, causing slight damage to mealie and lucerne crops.

RYEDALE (Aberdeen).—One of the driest months on record. Caterpillars innumerable everywhere.

SUTHERLAND.—We have had a peculiar month; very hot and very cold. This is the coldest place in the Colony.

THEKOPTEIN (Hanover).—Light variable winds, heat quite tropical from 7th to 15th, when a cool snap set in; one or two mornings approaching frost. Veld generally in good order. Stock fat and healthy. Garden stuffs rather late.

"THE LANDE" (Richmond).—Hoar frost on 18th killing late crops and garden produce. Veld looking fine, though somewhat damaged by "rispers."

HUXLEY FARM (Stutterheim).—Good rains for growing crops and springs. Veld looking beautiful and live stock doing well.

CLIFTON (Sterkstroom).—Splendid rains. Stock and crops doing well. Veld in good condition. Frost on 28th and 30th.

- LYNDENE (Albert).—**Veld and cattle in good condition. Dams and springs full. Mealie crops ripening well. Garden stuff plentiful. Lucerne very good.
- SUNNYMEADE (Albert).—**An exceptionally dry month. Weather threatened several times during month but very little moisture fell. Stock doing well.
- THIBET PARK (Queenstown).—**Very dry for March.
- SOMERVILLE (Tsolo).—**Crops have made excellent progress during month. An exceptional absence of hail the whole season.
- TENT KOP (Maclear).—**Rather hard frost on 31st. The first here though there have been several frosts already on Drakensberg. Rains have been heavier further away from the Berg.
- ARMADILLO CREEK (Vryburg).—**The chief climatic character of Bechuanaland is the absence of wind. One and a half inches of rain for the most heavily taxed growing month has proved insufficient and fine mealie fields are to be seen bleaching and gasping in all directions. No sound nor trace of locusts.
- NOTTINGHAME (Mafeking).—**As a result of the scanty rains, the crops have partially failed but large stocks of grain still in hand and there will be no scarcity. The Veld is still moderately green and all classes of stock in grand condition.
- GROOT DRAKENSTEIN.—**Mean temperature 1.9° above the average 10 years—the day temperatures being 1.6° and the nights 2.3° in excess. Rainfall $0.60''$ below the average of 10 years, or about one half. The wind blew almost constantly from a Southerly direction, only occurring on one day from a Northerly.
- UITENHAGE.—**Zwartkops River flooded on 27th. Owing to frequent rains which were quite exceptional for February the veld is in a grand condition.
- KOKSTAD (Coyte).—**Severe storms and a good deal of rain this month. The rivers remain full and the roads are indescribable.
- CARNARVON FARM.—**March rainfall is about half the last nine years' average. Less than half the average wind and above the average rainy days. The frosts of 30th, and 31st, "did for" all mealies, pumpkins, etc., in vlel and swampy lands. Mealie crop apart from this is a bad one, rains came too late and when we did have them there was nearly a month of rainy days for January and February, so crops did not die of drought but were drowned! All stock fat; veld good; water plentiful. Locusts a thing of the past (seemingly). Butter a drug, 6d. and 8d. best brands locally. Potatoes unsaleable. May rise in value August and September. Last few days quite summery. One good ploughing rain and things "will hum."

	Rain.	Wind.	Frost.	Cloudless days.	Rainy days.
1901	4.95	2	1	0	15
1902	1.18	4	0	1	8
1903	0.14	7	2	2	2
1904	2.98	3	0	0	10
1905	1.86	5	0	1	11
1906	3.30	5	2	0	10
1907	3.58	3	0	0	12
1908	1.86	13	0	0	7
1909	3.28	5	1	0	9
1910	1.43	2	1	1	8
Means	2.45	5	0.7	0.5	9

STATIONS.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ...	76.4	58.9	67.6	86.6	24	43.3	21
Cape Town (S.A.C.) ...	81.8	60.7	71.2	96.0	23	51.5	30
Do. City Hospital ...	78.8	58.2	68.5	90.8	23	48.7	21
Table Mountain (Dra Head)	68.3	52.6	60.4	83.5	12	43.0	28
Do. (Devil's Peak)	72.0	51.1	63.0	84.0	31	43.0	2
Wynberg ...	71.5	57.1	65.8	81.0	3	48.0	21
Bishops court ...	72.5	59.9	65.2	82.0	24	45.0	20
Groot Constantia ...	71.5	57.1	65.8	82.0	23	51.0	18, 20 & 30
Rutreat ...	71.3	56.4	65.4	81.7	3	31.6	21
Elsenberg (Agri. College) ...	82.8	55.3	69.0	93.7	9	48.3	20
Groot Drakenstein ...	83.5	61.0	72.2	95.7	12	50.4	17
Danger Point ...	64.8	56.5	60.6	68.0	1, 3 & 22	52.0	21
Robertson (Plantation) ...	78.8	58.1	68.4	95.0	21	41.5	19 & 20
O'okiep ...	83.6	59.2	71.4	98.0	9	47.0	17
Port Nolloth ...	66.7	52.5	59.6	72.0	31	15.5	17
Cape Agulhas ...	69.5	62.1	65.8	74.0	6, 7, 8 & 11	56.0	18
Uitenhage ...	79.4	59.1	69.2	98.0	14	45.0	31
Port Elizabeth ...	72.9	60.5	66.7	84.0	21	51.0	19, 20, 29 & 31
Mossel Bay ...	71.4	60.7	66.0	79.0	14 & 21	52.0	31
Storms' River ...	71.9	56.9	64.4	85.2	21	46.7	20
Cape St. Francis ...	68.3	59.1	63.7	75.0	11	50.0	20
Concordia (Plantation) ...	72.3	58.1	65.2	83.4	21	48.9	19
Van Staaden's ...	75.2	58.5	66.8	96.0	15	49.0	31
George (Plantation) ...	69.6	57.7	63.6	81.0	21	43.5	20
Dunbroiy ...	81.7	59.3	70.5	105.6	14	43.7	31
Heidelberg ...	76.1	56.4	66.2	87.0	8 & 23	44.0	20
Amalienstein ...	84.6	56.7	70.6	100.0	14	44.0	19
Murraysburg ...	82.3	55.6	69.0	97.0	15	39.0	19
Hanover ...	83.7	52.9	68.3	94.0	18	38.0	31
Kimberley ...	87.6	59.6	73.6	95.9	15	51.9	29
Cathcart ...	73.1	51.8	62.6	88.2	10	37.1	31
Sydney's Hope ...	73.0	57.4	65.2	96.2	14	49.0	3 & 20
East London ...	73.5	62.5	68.0	80.0	5 & 25	56.0	31
Stutterheim ...	75.5	57.1	66.3	90.2	14	43.0	31
Bedford ...	76.0	56.6	66.3	95.0	15	44.0	31
King William's Town ...	77.5	58.9	68.2	94.0	21	46.0	30
Chiselhurst ...	75.0	51.5	63.2	90.0	5	42.0	31
Aliwal North ...	82.0	53.4	67.7	91.0	15	45.0	29
Rietfontein (Aliwal N.) ...	75.5	52.9	64.2	85.0	15	42.3	31
Queenstown ...	78.3	56.1	67.2	92.0	14	45.0	31
Tabankulu ...	74.9	55.2	65.0	85.2	26	44.2	31
Kokstad ...	73.6	52.6	63.1	83.9	14	42.6	14
Umtata ...	77.5	59.0	68.2	91.0	25	47.0	31
Port St. John's ...	78.2	64.3	71.2	84.0	2	58.0	21
Main ...	74.4	57.5	66.0	88.8	25	47.5	31
Mochudi ...	83.7	60.7	72.2	93.0	27	53.0	25
Hope Fountain ...	75.4	58.8	67.1	83.4	17	51.0	24
Means ...	76.1	57.4	66.7	83.8	...	46.7	...
Extremes ...	...	...	...	105.6	14	34.6	21

RAINFALL, MARCH, 1910.

I. CAPE PENINSULA :

	INS.
Cape Town, Fire Station ..	2.27
Do. South African College	3.05
Do. Molteno Reservoir ...	3.19
Do. Platteklip ...	4.03
Do. Signal Hill ...	0.49
Do. Hospital ...	1.60
Camp's Bay ...	3.12
Table Mountain, Disa Head	2.98
Do. Kasteel Poort...	3.77
Do. Waai Kopje ...	2.35
Do. St. Michael's ...	3.88
Devil's Peak, Blockhouse	1.30
Do. Nursery ...	1.87
Woodstock (The Hall) ...	2.22
Newlands, Montebello ...	3.51
Bishopscourt ...	3.25
Kemilworth ...	3.13
Groot Constantia ...	2.91
Muizenberg (St. Res.) ...	3.91
Cape Point... ..	1.15
Robben Island ...	0.30
Durbanville ...	1.04
Maitland Cemetery ...	1.51
Tamboers Kloof ...	2.75
Lower Reservoir ...	3.34
Maclenns Beacon ...	3.11
Wani Vlei ...	3.07
Woodhead Dam ...	4.46

II. SOUTH-WEST :

Eerste River ...	0.95
Somerset West ...	2.44
Paarl ...	0.27
Groot Drakenstein, Weltevreden	0.73
Porterville Road ...	0.20
Tulbagh ...	0.12
Ceres ...	1.67
The Oaks ...	0.76
Rawsonville ...	0.33
Caledon ...	2.79
Worcester, Gaol ...	0.46
Hex River ...	0.77
Karnmelks River ...	3.24
Lady Grey, Div. Robertson	2.35
Robertson, Gaol ...	3.07
Do. Govt. Plantation	3.24
De Hoop ...	5.50
Montagu ...	6.86
Danger Point ...	3.50
Elgin Plantation ...	3.89
Elsenberg Agricultural College...	0.80
Roskeen ...	3.11
Vruchtbaar ...	0.41

III. WEST COAST :

Port Nolloth (Lient. Barber)	0.07
Anenous ...	0.85
Klipfontein ...	0.46
Kraaifontein ...	0.26
Ookiep ...	0.16
Garies ...	0.25
Lilyfontein ...	0.39
Van Rhyn's Dorp ...	0.03

III. WEST-COAST (continued) :

	INS.
Clanwilliam, Gaol ...	0.10
Dassen Island ...	0.39
Kersefontein ...	0.46
The Towers ...	0.35
Malmesbury ...	0.40
Piquetberg ...	0.70
Hopefield ...	0.48
Algeria (Clanwilliam)	0.90
Cedarberg (do.) ...	1.38

IV. SOUTH COAST :

Cape Agulhas ...	4.58
Bredasdorp... ..	4.65
Swellendam ...	6.62
Grootvaders Bosch ...	10.01
Heidelberg ...	2.13
Riversdale ...	3.40
Mossel Bay... ..	1.04
Great Brak River...	2.36
George ...	1.99
George (Plantation)	5.64
Woodfield (George)	4.73
Millwood ...	7.27
Sour Flats ...	4.79
Concordia ...	4.91
Buffel's Nek ...	6.43
Plettenberg Bay ...	1.70
Blauwkrantz ...	5.54
Lottering ...	5.24
Storm's River ...	4.66
Witte Els Bosch ...	4.28
Humansdorp ...	4.73
Cape St. Francis ...	2.83
Van Stad. n's (Intake)	4.69
Do. (On Hill) ...	4.05
Kruis River ...	2.92
Uitenhage (Gaol) ...	2.53
Do. (Park) ...	2.18
Do. (Inggs) ...	2.47
Dunbrody ...	1.16
Port Elizabeth (Harbour)	1.88
Do. ("The Slip") ...	1.89
Do. (Walm r Heights)	3.61
Centlivres ...	1.33
Edinburgh (Knysna) ...	3.82
Gamtoos Station ...	2.46

V. SOUTHERN KAROO :

Ladismith ...	1.12
Amalienstein ...	1.36
Vlaakte Plaats ...	1.05
Uniondale ...	2.22

VI. WEST-CENTRAL KAROO :

Prince Albert ...	0.86
Beaufort West, Gaol	0.86
Dunedin ...	1.17
Nel's Poort ...	1.24
Camfers Kraal ...	0.88
Krom River ...	1.52
Roos Plaats ...	1.28
Lemoenfontein ...	2.20
Willowmore ...	1.48
Steytlerville ...	1.76

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PIPES and

PIPE FITTINGS

PRODUCE MARKETS.

CAPE TOWN.

The Produce Department of the firm of R. Müller, Cape Town, reports for the month of April, 1910, as follows, viz. :—

Ostrich Feathers. The Market shows greater strength. All better qualities fetch exceedingly good prices. Even inferior classes are in good demand. There is a healthy feeling throughout. The local market shows great demand for good quality feathers.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes ...	19	0	0	31	0	0	Floss ...	0	7	6	1	10	0
First, ordinary to							Long Drabs ...	2	0	0	4	0	0
Seconds ...	11	0	0	15	0	0	Medium Drabs ...	0	15	0	1	5	0
Thirds ...	7	10	0	8	10	0	Short to Medium ...	0	5	0	0	15	0
Fourth ...	3	0	0	4	10	0	Floss ...	0	5	0	1	5	0
Femina Super ...	12	10	0	17	10	0	White Tails ...	1	2	6	2	5	0
Do., Seconds to							Coloured Tails ...	0	12	6	1	5	0
Firsts ...	4	10	0	10	10	0	Chicks... ..	0	1	0	0	2	6
Byock (Fancy) ...	4	10	0	8	10	0	Spadonas ...	0	10	0	2	10	0
Long Blacks ...	4	0	0	7	0	0	Inferior Black and						
Medium Blacks ...	1	10	0	2	10	0	Drabs, short to						
Short to Medium ...	0	10	0	2	10	0	long ...	0	0	6	1	7	6

Wool.—Prices remain unchanged for all good classes of wool, but the demand for short and faulty kinds is poor. Consignments, which were offered for sale, all found buyers. The following are the highest prices obtained at the Cape Town market recently, viz. :—Malmesbury, 6½d.; Calvinia, 7½d.; Piquetberg, 6½d.; Roggeveld, 7½d.; Roggeveld Superior, 8d.; Coarse and Coloured, 3½d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld ...	0	6½	0	6½	Wool for Washing ...	0	4½	0	7½
Do. Karoo ...	0	6	0	7½	Snow-white Super to Extra	1	4	1	9
Medium ...	0	5	0	6½	Do. Ordinary ...	1	2	1	5
Short and inferior ...	0	3	0	4½	Fleece Washed ...	0	0	0	10

Mohair.—Demand for fine hair has grown stronger. Inferior and heavy qualities only fetch low prices.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer ...	0	6	1	1	Winter ...	0	9	0	9½
Kids ...	1	3	1	8	Do. Kids... ..	0	11	1	2
Seconds ...	0	5	0	9					

Hides and Skins.—All the consignments which have arrived here were sold at exceedingly good prices, which are likely to keep up. The competition is sound. Up-country holders should hasten to send what they have on hand without loss of time.

	s.	d.	s.	d.		s.	d.	s.	d.
Long woolled Skins ...	0	5½	0	6½	Goat, heavy to light ...	1	2½	1	2½
Short... ..	0	4	0	4½	Sundried ...	0	0	0	6
Shorn ...	0	0	0	4	Angoras ...	0	4	0	6½
Bastards ...	0	9½	0	4½	Salted Whites ...	0	5½	0	7
Cape Skins, each ...	2	0	2	6	Sundried Hides ...	0	6½	0	7½
Do., cut, each ...	0	0	1	0	Wet... ..	0	3½	0	4½

PORT ELIZABETH.

Messrs. John Daverin & Co. report under date April 30th :—

Ostrich Feathers.—Three and a half days' sale was again held this week, the market being fully supplied with an assortment of average quality. The easier inclination reported last week became more decided, competition generally was less active, and prices of most classes of Whites and Feminas ruled decidedly lower. Best Whites and Feminas, as well as those of good average quality may be quoted as from 5 to 10 per cent. lower than they were three weeks ago, while the commoner qualities are also rather easier, though still fetching much higher prices than before the rise. Blacks and Drabs are firm, especially good Drabs, which are in strong demand. Tails remain unchanged. The total quantity sold amounted to £23,485 14s. 3d., and weighed 6,629 lbs. 8½ oz. New goods continue to arrive in large quantities, and stocks on hand have now assumed large proportions again.

We quote the following as current prices of :—

PRIMES :	£	s.	d.	£	s.	d.	TAILS (continued) :	£	s.	d.	£	s.	d.		
Extra Super ...	30	0	0	to	45	1	0	Female, dark, good							
WHITES :							average ...	0	6	6	to	0	12	6	
Good to Super ...	12	10	0	to	25	0	0	" dark, short							
Good Broken ...	9	0	0	to	15	0	0	and narrow...	0	0	6	to	0	2	6
Fair Average ...	8	0	0	to	10	0	0	BLACKS :							
Narrow ...	5	10	0	to	7	10	0	Long (special) ...	7	0	0	to	12	10	0
Thirds ...	2	10	0	to	5	10	0	" good ...	5	5	0	to	6	10	0
FEMINAS :							" fair ...	3	15	0	to	4	10	0	
Super ...	13	0	0	to	22	10	0	" drabby ...	2	0	0	to	3	10	0
Good to Super ...	8	0	0	to	12	10	0	Medium ...	1	5	0	to	3	15	0
Good Broken ...	6	0	0	to	12	0	0	Short ...	0	12	6	to	1	2	6
Fair Average ...	5	0	0	to	7	0	0	Wiry ...	0	0	6	to	0	2	6
Narrow ...	2	0	0	to	4	0	0	Floss, long ...	0	12	6	to	1	2	6
Thirds ...	1	0	0	to	2	10	0	" short ...	0	5	0	to	0	9	0
Greys ...	3	0	0	to	10	0	0	DRABS :							
FANCIES :							Long (special) ...	4	10	0	to	7	0	0	
Super ...	8	10	0	to	11	10	0	" good ...	2	15	0	to	3	15	0
Good ...	6	10	0	to	8	0	0	" fair ...	1	5	0	to	1	15	0
Poor and Narrow ...	3	0	0	to	5	0	0	Medium ...	0	12	6	to	1	10	0
TAILS :							Short ...	0	2	6	to	0	9	0	
Male, good big bold	2	5	0	to	3	10	0	Wiry ...	0	0	3	to	0	1	0
" good average	1	0	0	to	1	15	0	Floss, long ...	0	12	6	to	1	2	6
" Short & Narrow	0	7	6	to	0	15	0	" short ...	0	5	0	to	0	7	6
Female, light, good,							SPADONAS :								
big, bold ...	2	0	0	to	3	10	0	Light (special) ...	5	0	0	to	7	0	0
" light, good							" fair to good...	0	5	0	to	4	5	0	
average ...	1	0	0	to	1	15	0	" narrow ...	0	7	6	to	0	17	6
" light, short							Dark ...	0	10	0	to	3	0	0	
and narrow...	0	3	6	to	0	10	0	CHICKS ...	0	0	3	to	0	7	6
" dark, good,															
big, bold ...	0	15	0	to	1	10	0								

The following may be quoted as the approximate current values of unsorted parcels per line :—

Whites.										Feminas.										
Superior pluckings ...	...	...	...	£9	0	0	to	£15	0	0	£6	10	0	to	£9	0	0			
Good Average lots ...	...	...	...	7	0	0	to	8	10	0	5	0	0	to	6	0	0			
Poor Average lots ...	...	...	...	4	10	0	to	6	10	0	2	0	0	to	3	15	0			
Common lots, stalky, narrow and discoloured ...	...	...	...	2	0	0	to	4	0	0	1	0	0	to	1	15	0			
Tails.				Blacks.				Drabs.				Spadonas.								
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.		
Good ...	11	0	to	16	0	20	0	to	50	0	12	6	to	17	6	30	0	to	40	0
Average ...	7	6	to	10	0	12	6	to	17	6	8	6	to	11	6	12	6	to	22	6
Poor ...	3	6	to	6	6	7	6	to	10	0	5	0	to	7	6	2	6	to	10	0

It will be understood that for Special Lots these quotations may be exceeded.

Wool.—The London Sales opened on Tuesday last, prices of last series being fully maintained. At the Catalogue Sale held here this week 3,545 bales were offered, and 1,040 bales sold. The bulk of the offerings consisted of short, seedy, and undesirable

wools, for which competition was dull, prices ruling a farthing lower. All light conditioned parcels free from burr and seed realised fully late rates. A few lots of Snow-white, free of seed and of good colour, realised satisfactory prices. A fair amount of business has been done out of hand during the week, our own sales totalling 700 bales.

Snowwhite, Extra Superior ... 20½d to 21½d	Grease, Coarse and Coloured ... 1d to 4d
Do. Superior ... 18½d „ 19½d	Scoured do. do. ... 1½d „ 8½d
Do. Good to Superior ... 17d „ 17½d	Basuto Grease, short ... 6½d „ 6¾d
Do. Inferior Faulty ... 14d „ 15d	O.R.C. Grassveld Grease, long & well-conditioned (special clips) 7½d „ 8d
Grease, Super Long, well-conditioned, Grassveld grown (special clips) ... 8½d „ 10d	Do. do. do. ... 6½d „ 7d
Do. do. do. ... 7½d „ 8½d	Do. do. medium grown, light, with little fault ... 6d „ 6½d
Do. do. Karoo grown (special clips) 7½d „ 8½d	Do. do. short, faulty & wasty 4½d „ 5½d
Do. do. do. ... 6¾d 7½d	Do. do. Karoo grown, long & well-conditioned ... 6½d „ 7½d
Do. do. Mixed Veldt... 7d „ 7½d	Do. do. medium grown, light with little fault ... 6d „ 6½d
Do. Light, faultless, medium Grassveldt grown ... 6½d „ 7½d	Do. do. short, faulty and wasty... ... 4½d „ 5½d
Do. do. Karoo grown 6½d „ 7½d	
Do. do. short, do. 6d „ 6½d	

Mohair.—Our cable from London reports a steady consumption, and a good business has been done in parcels of good quality and colour. Future prospects for this description are encouraging, but short-grown, stained and seedy parcels can only be moved off at relatively lower prices. A large quantity of mixed O.R.C. hair was offered on Tuesday's public market, the bulk of which was sold, prices showing no change. There is some enquiry for full-grown clean firsts at 12½d., but so far no business has been done, nor have there been any transactions in Summer Kids.

Super Kids None offering	Mixed O.R.C. very mixed ... 7d to 8d
Ordinary Kids and Stained ... do.	Seconds and Grey ... 5d „ 7½d
Superior Firsts, special clips ... 12½d to 12½d	Thirds ... 4½d „ 4¾d
Ordinary Firsts... .. 11½d „ 12d	Winter Kids, special clips, nominal ... 16d „ 16½d
Short Firsts and Stained ... 10d „ 10½d	Do. good ordinary ... 14d „ 15d
Superfine Long Blue O.R.C. Hair ... 10½d „ 13d	Winter Hair ... 9½d „ 10d
Mixed O.R.C. Hair (average) 8½d to 10½d	Basuto Hair ... 8½d „ 10d

Skins.—Sheepskins sold this week in bundles at 5½d., and Pelts at 4½d. per lb.; Capes, 1s. 11d. to 2s. 1d.; damaged, 6d. each; Goatskins, 13½d.; damaged, 7d. per lb.; and Heavy Goatskins, 8½d.; Angoras, 7½d.; Shorn, 5½d.; damaged, 3½d. per lb.; Johannesburg Sheep, 5½d.; Goat, 9d.; Angoras, 6½d.; Springbok, 8½d. each.

Hides.—Sundried, 9½d.; damaged, 8½d.; Salted, 8½d.; damaged, 7½d.; Thirds, 3½d. *Horns.*—3½d. each all round.

EAST LONDON.

Messrs. Malcomess & Co., Ltd., of East London, report for the month ending April 30:—

Wool.—Since last we wrote the market has been fairly steady. Long Wools throughout have been firm with a hardening tendency, with the result that there has been no accumulation of stocks, and the season is now over. Values have constantly been rising in Cape Tops, which started in November at 25d. and are now up to 28½d. in Bradford. At the London Sales, which opened on 26th inst., Australian Merinos showed an advance of par to 5 per cent., whilst Capes were unchanged.

Short Wools.—The position of this class is not so sound as that of Long Grease, which has been reflected also on Noils. Whilst Noils could be sold at 16d. a month ago, to-day they only fetch 15½d. with difficulty. At the London Sales of the 26th inst., no Short Wools had then been offered, and no one knows how they will turn out. Our own opinion is that they will ease off slightly.

Our local Sales have progressed as follows:—On 2nd inst., 2,200 bales were offered and 700 sold; on the 9th inst., 3,300 bales were offered and 1,600 sold; on the 16th inst., 5,300 bales were offered and 1,600 sold; on the 23rd inst., 4,000 bales were offered and 1,300 sold.

Transkeis, which started the season at the high level of 8½d. for the best and driest lots, have now come down fully ½d., and in the case of damp wools values are now ¾d. lower than at the start.

Ordinary Short Up-country Grease was more or less neglected owing to faulty and wasty condition, but any superior, light Wools have fetched extreme prices, and Kaffrarian farmers have done exceedingly well, fetching up to 11d. for Superior Skirted Hoggets, and 10½d. for Superior Light Short Grease.

Transactions during the month total 15,000 bales, but as receivings have been very heavy and certain wools have been unsaleable, stocks have increased and total about 15,000 bales. We quote:—

Transkei Natives	7½d to 8½d	Super Short Skirted Farmers	7½d to 8½d
Pasuto ditto	6½d „ 7½d	Good Long well-conditioned	
Ordinary Native Grease ...	6½d „ 7½d	Grassveldt	6½d „ 7½d
Super Light Long Kaffrians,		Short ditto ditto ...	5½d „ 6½d
well-conditioned... ..	10d „ 11d	Short faulty wasty Grease ...	5d „ 5½d
Super Light Short ditto ...	9d „ 10½d	Coarse and Coloured Grease	3d „ 5½d
Long well Skirted Farmers ...	No stocks		

Mohair.—This market is quiet. The new season is just commencing, and both buyers and sellers are adopting a waiting attitude pending the arrival of larger consignments. First clippings have been rather deficient in length, and are inclined to be rather seedy. We quote:—

Superior Kids	None offering	Mixed O.R.C.	8½d to 10½d
Superior Firsts, Special Clips	12d to 12½d	Seconds and Grease	5d „ 7½d
Ordinary Firsts	11½d „ 12d	Thirds	4d „ 5d
Short Firsts	10d „ 10½d	Basuto Mohair... ..	8½d „ 10d

Sundry Produce.—We quote:—Sheepskins, owing to the inferior composition of parcels now arriving, and the weakness of the Roan market, 5½d. and 4½d.; Goatskins, 12½d.; Angora Skins, 8½d.; damages, 7d.; Hides, Sundried, at 7½d., and Dry-salted at 8½d. Horns, according to size and quality, 2d. to 4d. each.

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OPPOSITE RAILWAY STATION.

MILK RECORD.

ELSENBURG COLLEGE HERD.

Subjoined is the Milk Record to the 30th April, 1910 :—

Breed and Cow.	Days in Milk.	YIELD IN LBS.		
		During April.	Total to date.	Daily Average.
FRIESLANDS.				
Vera	297	80	6,568	22·1
Bell	280	301	8,326	29·7
Belladonna	213	180	4,249	17·5
Rose	16	317	4,839	27·5
Beauty	95	485	2,303	24·2
Victoria	13	911	1,330	30·9
Cleopatra	7	284	284	10·6
JERSEYS.				
Gus	261	134	4,460	17·1
Fanny	249	146	3,813	15·3
Glee	195	238	3,266	16·7
Gertie	20	488	488	24·4
Gwendolen	1	19	19	19·0
SHORTHORN.				
Maggie	290	265	6,731	23·2

BREEDERS' DIRECTORY & FARMING NOTICES.

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SHEEP.—Woolled Persian Thoroughbred. Cross-bred Rams (Merino and Hair Persian) from above. Price, £3 and £2 each. Large carcass, good wool growers, early maturing, hardy and vigorous, excellent mutton.—A. J. C. PARRY, Sheldon.

GENERAL.

PASPALUM GRASS PLANTS.—Strong roots per Rail or smaller plants per Post to any address. See larger advertisement, page ix, this Journal.—A. C. BULLER, Dwaarsriviers Hoek, Stellenbosch.

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R. W. HAZELL, Tregenna, Park Road, Rondebosch, Breeder of High Class Exhibition and Utility White Wyandottes, Black Orpingtons and Houdans. Wyandottes a speciality. Eggs and Stock for Sale. Inspection and correspondence invited. Many testimonials from pleased customers.

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Catalogue
and
Garden Guide
Now Ready,
and Free on
Application.

CHAS. AYRES,

. . The Cape . .
Seedsman & Florist,

CAPE TOWN

THE Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 6.

JUNE, 1910.

VOL. XXXVI.

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CONTENTS.

	PAGE
NOTES	628
The Mixing of Manures—Arsenite of Soda—Capri and Calimyræ Figs for Distribution—Packed Commodities (Reduced Weights)—A Fine Pig (<i>Illustrated</i>)—Citrus Publications—The Poultry Industry—Koen and Gonw's Prickly Pear Destroyer—Annual Wine Show—Is South Africa Drying Up?—Rainfall and Run-off—About Rape—Perennial Weeds Rat Destruction—Scientific Apparatus and Laboratory Chemicals—Farmers' Bookkeeping.	
DRIED FRUIT AND RAISIN INDUSTRY	636
A SOUTH AFRICAN BOTANIC GARDEN	638
ARGEMONE MEXICANA OR MEXICAN POPPY (<i>Illustrated</i>)	642
CARBON BISULPHIDE FOR GRAIN INSECTS (<i>Illustrated</i>)	643
MANURING WHEAT IN THE HUMANSDORP DISTRICT	647
MANURIAL EXPERIMENTS WITH OATS: HUMANSDORP DISTRICT	652
AGRICULTURAL ORGANISATION	655
AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS (<i>Continued</i>)—(<i>Illustrated</i>)	659
ONICUS LANCEOLATUS, Hoffm., OR SPEAR THISTLE (<i>Illustrated</i>)	674
CO-OPERATIVE EXPERIMENTS—GRASSES	675
MILK RECORD	691
THE FUTURE DEVELOPMENT OF AGRICULTURE IN SOUTH AFRICA	692
RETURN OF OUTBREAKS OF CONTAGIOUS DISEASES	700
FARMERS' CONGRESS, 1910	701
TABULATED SUMMARY OF CAPE PRODUCE REJECTED BY THE TRANSVAAL ON ACCOUNT OF PESTS	730
EGG-LAYING COMPETITION	731
CORRESPONDENCE	733
Permanganate of Potash for Bee Stings—A Manuring Problem—Lime and Milk—Poisoning Small Birds and Hares—Handpower Threshing Machines—The Dangers of Improperly Prepared Lucerne Hay—Snake Bites—Farm Night Soil.	
FRUIT EXPORT FOR APRIL, 1910	739
NOTES ON THE WEATHER OF APRIL, 1910	741
RAINFALL	746
DEPARTMENTAL NOTICES	749
CURRENT MARKET RATES	751
PRODUCE MARKETS	752

NOTES.

The Mixing of Manures.

With this issue a coloured diagram is inserted, which shows at a glance how manures can be mixed, and above all which mixtures should be avoided. This diagram, on a large scale, formed part of the Departmental exhibit at last season's Agricultural Shows. Its publication in the present form was decided upon at the request of a number of farmers. We may add that the diagram is compiled on experience and practice in South Africa.

Arsenite of Soda.

From and after the 1st June, 1910, and until further notice, the price charged for Arsenite of Soda will be at the rate of £1 7s. 6d. (one pound seven shillings and sixpence sterling) per drum containing 112 lbs., delivered at any of the depôts established for the sale thereof.

Capri and Calimyra Figs for Distribution.

The Agricultural Department has available for disposal 3,000 rooted plants of each of the following varieties of figs, viz.:—Capri and Calimyra. The price at which these will be disposed of is 3s. per dozen plants, and any persons who may be desirous of availing themselves of this opportunity should make application to the Horticultural Assistant, Department of Agriculture, Cape Town, enclosing the necessary remittance for the sum involved.

Packed Commodities.—Reduced Weights.

The Cape Town Chamber of Commerce forwards the following circular letter:—

There is great divergence of practice in different parts of the country with regard to the unit of weights and measures, and of the contents of various reputed vessels containing commodities sold by weight and measure in original packets.

This Chamber is of opinion, and will recommend at a future time, that steps be taken for the insertion of a clause in the Customs Tariff providing that any given weight of any article sold by weight shall be deemed to be that weight for the purpose of the payment of Customs duties, unless the outside of such packets, tins, kegs, or otherwise contains indelibly stamped thereon the gross weight, the tare, and the net weight of the contents.

This is a very important matter from the point of view of private users, for of late years there has been a tendency to reduce the weights of packed commodities which were formerly recognised. An instance in point is barbed wire, which formerly used to be sold as 100 lbs. net; then this was followed by the package weighing 100 lbs. gross, and so the practice was modified until to-day it is stated that nominally 100 lb. packets contain 98, 97, or even less weight of wire. This also applies to white and red lead, oils, turpentine, and other such articles.

The private consumer is not aware of these divergent practices, and I should, therefore, be glad if you would kindly draw attention to the necessity of ensuring that quantities asked for are actually delivered, and not reputed quantities, so that the general public may obtain what they expect to receive.

A Fine Pig.

Mr. D. C. Giddy, C.C. and R.M., Namaqualand, forwards the accompanying photo. for publication. He says this animal was bred by Mr.



Hendrik G. Visser, of Garics, Namaqualand. It measures seven feet from point of nose to end of tail, is 6 ft. 6 in. in circumference, and 3 feet high.

Citrus Publications.

The Government has secured a limited number of the following United States Department of Agriculture pamphlets: (1) "The Decay of Oranges while in Transit from California. Bulletin No. 123, Bureau of Plant Industry. (2) "The Status of the American Lemon Industry." Reprint from 1907 Year Book of the U.S. Department of Agriculture. These publications are fraught with information of high importance to fruit-growers confronted with the problem of placing oranges and lemons in sound condition upon distant markets. They deal in detail with the causes of decay and upon the precautions that should be exercised in picking and packing the fruit. The Californian method of colouring, curing and storing lemons is described. Both are well illustrated, and each contains a coloured plate. The two will be sent to any fruit-grower on receipt of an application accompanied by the cost price—1s. 6d. for the two. Applications should be addressed to the Under Secretary for Agriculture, Cape Town.

The Poultry Industry.

The Agricultural Department has had under consideration the question of the encouragement of the egg industry in this Province with a view to securing for the local farming community a large proportion, if not the whole, of the expenditure still incurred in the importation of eggs from abroad amounting roughly to about £40,000 per annum. In this connection it has occurred to the Secretary for Agriculture that considerable assistance might be rendered and an impetus given to the industry if the sympathies of the various co-operative dairies scattered throughout the Colony could be enlisted, and inquiries are now being made as to whether any steps are at present taken by these concerns in the direction of collecting, grading and marketing of eggs and, if not, whether the management will favour the Department with an expression of opinion as to the feasibility of such a scheme being undertaken as an adjunct to the dairy business. It is felt that the methods by which cream is supplied to the dairies afford just the means required for the systematic collection of eggs, and that an outlet for the supply of fresh eggs to the market say, three times weekly, will by bringing them a direct monetary return, induce farmers to keep better laying strains of fowls and to give greater attention to their proper management. The Darling Creamery is already acting on these lines.

Koen & Gouw's Prickly Pear Destroyer.

In order to demonstrate the efficiency of a certain poison prepared by Messrs. Koen & Gouws, for the destruction of prickly pear, Mr. A. Kay Hards, Assistant to the Government Agriculturist, carried out a small experiment in the district of Aberdeen, with results, as far as they can be judged, of an eminently satisfactory nature. The experiment was carried out on a piece of land of quarter morgen in extent, about half covered with medium-sized prickly pear, the poison being injected on the 22nd November, 1909. It occupied the time of four men each working 2½ hours to doctor the prickly pear, for which 15 gallons of the mixture, which is sold at 1s. 6d. per gallon, was used. Taking the foregoing as for the quarter morgen, it will be seen that the treatment of a morgen of infested land would cost £4 17s. 4d., computed as follows:—

	s.	d.
4 men, working 11 hours each, at 2d. per hour ...	7	4
60 gallons Koen & Gouws' preparation, at 1/6 ...	90	0
	97	4

Three weeks after the poison was injected it was found that with one or two exceptions the trees treated were quite dead to the main stem. The exceptions had still a few green stems, but on being cut open these were found to be infected, and in some cases the pith had already turned black. It was noticed also that those leaves which fell had no life, which points to the fact that they must have been quite dead before they fell. This is a valuable feature, as it is possible for fallen leaves to start a new growth, nullifying to a certain extent the benefit of the poisoning. The method of injection is very simple. A knife with a sharp point is inserted in the leaf and moved backwards and forwards, then twisted so as to enlarge the opening into which the poison, for which an ordinary kettle is used, is poured.

Messrs. Koen & Gouws' preparation can be manufactured in quantity at a cost of 25s. per 100 gallons, and it will be seen that the cost of destroying a morgen of prickly pear can thus be reduced from £4 17s. 4d. to £1 2s. 4d. As there is little doubt that the mixture would have had the same effect if a smaller quantity were used, this would still further reduce the cost. It must also be borne in mind that the labour was unskilled, and it is quite possible that after a certain amount of practice the four men could have done double the amount of work in the time occupied for the quarter morgen. Five months after the treatment of the prickly pear as related above, an officer of the Agricultural Department inspected the plot, and his report, just to hand, is most satisfactory. It states that all the trees, excepting two, were completely dead, main stems and roots included. The two exceptions were trees receiving only one injection each of the poison, as an experiment. These were not destroyed to the same extent as the others, and it seems, therefore, that more than one injection is necessary for the complete destruction of the tree. It was also noticed that there is no tendency for the trees to shed their leaves after being treated. In the few instances where this did happen, however, the fallen leaves were quite dead. As already stated, this is a valuable feature in favour of the preparation, as the virility of the plant is well known. Other plots privately treated with the mixture bear out the results obtained from the above experiment, and the poison has certainly demonstrated its efficacy as a destroyer of prickly pear. It is understood that the mixture may now be bought at 1s. per gallon.

Annual Wine Show.

The Western Province Horticultural Board has issued the prize list for the annual show of Dark, Sweet and White Wines and Brandies of Vintage 1910, to be held in Cape Town on Wednesday, August 17. The prizes in each class are gold medal for first, silver medal for second, and bronze medal for third, with the exception of the specials. The classes are as under:—Section A, White Wines.—Class 1: Best 10 Leaguers Wine of a Hock type (Light White Wines). Class 2: Best 10 Leaguers Wine of Sauterne type (White Wines between Hock and Sherry type). Class 3: Best 10 Leaguers Wine of Sherry type (Heavy White Wines). Class 4: Best 5 Leaguers Sweetish White Wine (Madeira type). Class 5: Best 5 Leaguers Sweet White Wine. Class 6: Best 10 Leaguers Stein. Class 7: Best 10 Leaguers Green Grape. Class 8: Best 10 Leaguers White French. Class 9: Best 5 Leaguers any other variety of White Wine, unmixed. Section B, Red Wines.—Class 10: Best 10 Leaguers Wine of a Claret type (Light Red Wines). Class 11: Best 10 Leaguers Wine of a Burgundy type (Full-bodied Wines). Class 12: Best 5 Leaguers Heavy Dry Red Wine (Port type). Class 13: Best 5 Leaguers Heavy Sweetish Red Wine (Sweet Port type). Class 14: Best 5 Leaguers Sweet Red Wine. Class 15: Best 10 Leaguers Hermitage. Class 16: Best 5 Leaguers Cabernet de Sauvignon. Class 17: Best 5 Leaguers Pontac. Class 18: Best 5 Leaguers any other variety of Red Wine, unmixed. Section C, Brandies, Liqueurs, etc.—Class 19: Best 2 Leaguers Wine Brandy. Class 20: Best Half-Aumr Van der Hum. Class 21: Best 5 Leaguers Pure Wine Vinegar. Class 22: Best 5 Leaguers Geripieco. Class 23: Best 5 Leaguers Wine Syrup. (The rule as regards exhibits being of the 1910 Vintage does not apply in Class 20.) Special Prizes.—Class 24: Best 10 Leaguers Light White Wine (presented by J. W. Jagger, Esq., M.L.A.), Silver Cup, value £5. Class 25: Best 10 Leaguers Light Red Wine (presented by the Wine Merchants of Cape Town), Silver Cup, value £5. The entries close on August 17. Further particulars are obtainable of the Secretary, Mr. A. A. Persee, Parker's Buildings, Cape Town.

Is South Africa Drying Up?

The controversy started by Mr. F. H. Barber, in the February issue of the *Agricultural Journal*, under the above heading, has been continued in other publications. Since the original contribution we quoted the statement of a Bechuanaland correspondent casting doubt on the conclusions drawn by Mr. Barber. On this Mr. Barber again writes affirming the exact truth of his original statements, and we have also received the following letter from Mr. H. M. Barber, F.R.G.S., who accompanied Mr. F. H. Barber on the trip in question. The letter is also signed by Mr. Bertram E. White, another of the party. We publish the letter in full as under:—

"In an article written by my brother, Mr. F. H. Barber, on 'Droughts and their Causes,' in the *Agricultural Journal*, he mentions among other signs of the drying up of the country, thousands of old dead trees on the Mashowing River.

"In a later *Journal* appears a letter written by someone who signs himself 'Mashowing,' denying the fact that there were dead trees on the Mashowing River, which in a measure refutes my brother's statements. Having travelled with my brother and Mr. Bertram White, then of Table Farm, on a shooting and prospecting trip down the Mashowing to the junction of the Kuruman River, and along it away west to the junction of the Molopo River and down it to Swart Modder, which is a few miles above the junction of it and the Orange River, I am sure Mr. White and I can both substantiate the fact that we saw a great many thousands of dead camel thorn trees along these rivers. When we travelled down the river between the junction of the Mashowing and Kuruman River to the junction of the Molopo, a distance of some 200 or 300 miles, the large dead trees in the old river bed (which we were travelling in) and on either bank were quite a sad feature in the landscape. We were told by the people that lived on the Lower Molopo River that only once since that country had been known to white people had the waters from the Kuruman River ever reached and flowed past the junction of the Molopo, and this had taken place through an abnormal flood from the Upper Mashowing and Kuruman Rivers a year or so before we visited that country, and so lost had the old river bed become that the waters wandered away west and lodged in a large depression then named Griquas Pan, but which was then fast drying up. When we were there from just below the junction of the Mashowing and Kuruman Rivers down to the Molopo junction, water could only be got at a few places mostly in pits in the river bed, and often long distances apart. One stretch we had without water was 110 miles, and two others of 60, and so on, and had we not had a wagon with three large tanks of water on it, I don't think we would ever have been able to follow these rivers down.

"In many places I noticed the sheer red walls of the old rivers' banks with fresh water mussel shells still sticking in them many feet above the bed of the old river, and in the bed itself were large water-worn boulders and pebbles, showing that there had been a great flow of water there in bygone years, and in places where 'kopjes' and ridges jutted on to the river you could see where the swirl of water had rounded off their ends probably thousands of years before.

"That the Kuruman and Molopo Rivers were once beautiful flowing streams, there is no doubt, but where are those waters now? Huge sand dunes, many feet high, have completely obliterated it in places, and in others the lone and level sands of the desert stretch far away, leaving not even a trace of where those waters flowed, so completely have they obliterated its very locality.

"It is now about thirteen years since we travelled down these rivers, and I feel sure that most of the dead trees we saw have been cut down for firewood along the upper portions of these rivers, and I am quite sure if 'Mashowing' followed our track down as far as the junction of the Kuru-man and Molopo, he would then verify my brother's statements himself."

Rainfall and Run-off.

So much for the dispute as to details. We did not cast any doubt upon Mr. Barber's statements as to the existence of the dead trees on the occasion of his trip, our only demur was the deduction as to the drying up of this country. The casual observer in this particular case is always inclined to confuse the rainfall with the run-off. A careful examination of our rainfall averages shows great variations, but taken over fairly lengthy periods it would be difficult to prove any appreciable diminution. Where the trouble arises is in the run-off. The country is naturally very steep, and with the advent of the European with his flocks and herds, the natural sources of conservation have been injured, and the run-off is undoubtedly much greater than it was, say, a century back. In discussing this subject these two points should always be kept separate. Mr. Barber in his first contribution quotes a diminishing rainfall at Grahamstown as shown by returns. Within the past few weeks the same spot was flooded with nine inches in about 72 hours. The same theory was a favourite with a number of Midland farmers a few years back. Then the wet seasons recurred, and to-day it is never mentioned; which, as we remarked before, all goes to show the futility of such speculations.

About Rape.

As so many of our farmers are now taking seriously to rape as a crop, the following interesting hints from the "Australasian" should prove of value: Cattle and sheep, remarks that paper, should never be turned on to rape when hungry, lest they eat too freely of it. When sheep are put upon it they may be left there, but when they have free access to pasture they will probably do better, and they should always be provided with rock salt to lick. On frosty mornings they should be kept off the rape for a time. The owners of pure-bred stock should use much care when pasturing animals on rape. The following conclusions in connection with rape are interesting:—1. That rape is specially valuable as a pasture for fattening sheep and lambs, owing to the season at which it is grown and to its high feeding value. 2. That it is an excellent food when preparing lambs for winter or early spring fattening. 3. That one acre of rape, grown in drills, immediately after a crop of rye, or cut as green food, will pasture from 10 to 16 lambs from two to two and a half months, and that when grown as the sole crop of the season under favourable conditions, it will sustain a much larger number. 4. That ordinary grade lambs when pastured on rape without any other food supplement, will make an average gain of 10 lb. per month. 5. That rape is admirably adapted for growing as a catch crop to be fed off, or ploughed under as a green manure. 6. That rape as a cleaning crop is probably without rival in our present system of agriculture. 7. That much care and prudence must be exercised in pasturing animals on rape, or serious losses may follow. 8. That rape is not an exhaustive crop on soil when pastured, as what has been taken off from the cultivable area is returned to it, with something in addition. The most suitable soils for growing rape are fairly moist, free-working loams,

rich in organic matter. Black loams are very suitable for the plants after they once get a start, on account of the large amount of humus which they contain. Rape luxuriates in soils abounding in vegetable matter. We may add to the above that rape has been proved an excellent pasture for ostriches. In the Eastern Province thousands of birds are now fed on that crop and thrive splendidly.

Perennial Weeds.

Perennials are by far the most troublesome of all weeds and require thorough treatment, in some instances the cultivation of special crops, to insure their eradication. Imperfect treatment such as a single ploughing, often does more harm than good, by breaking up the rootstocks and stimulating growth.

For shallow-rooted perennials, infested land should be ploughed so lightly that the roots are exposed to the sun to dry up. For deep-rooted perennials, on the other hand, ploughing should be as deep as conveniently possible. The nature of the land must determine the depth of ploughing. In light or gravelly soils shallow ploughing may be preferable as deep ploughing might interfere with the mechanical texture of the soil, which is so important in the storing of moisture.

The rootstalks of some perennial weeds are very persistent. Small sections or cuttings from them will quickly take root when they are distributed by ploughing or cultivation. Where such persistent perennials have become well established it is usually advisable to adopt the most convenient method of cultivation that will bring the root-stalks to the surface. They should then be gathered and burnt or otherwise destroyed. Most perennial weeds will, however, succumb to continued thorough cultivation that will prevent the growth of leaves.

Plants take in most of their food through their leaves. Perennial plants, which live for many years, have special reservoirs where some of this food, after elaboration, is stored in such receptacles as bulbs, tubers and fleshy rootstalks. The first growth in spring, particularly flowering stems, is produced mainly by drawing on this special store of nourishment. Plants are therefore in their weakest condition when they have largely exhausted their reserve supply of food and have not time to replenish it. The stage of growth, then, when ploughing will be most effective is when their flowering stems have made full growth but before the seeds, which would be a source of danger, have had time to mature.—*Farm and Dairy.*

Rat Destruction.

The following are reputed as effective mixtures for poisoning rats. Some of our enterprising readers might try one or other of these methods in some of the patches of rat infested veld which are such an eyesore in some districts.—Arsenical paste—Oatmeal or wheaten flour, 3 lb., powdered indigo $\frac{1}{2}$ oz., finely powdered white arsenic $\frac{1}{4}$ lb., oil of aniseed $\frac{1}{2}$ drachm, mix together and add $2\frac{1}{2}$ lb. of melted suet, then beat the whole into a paste. Arsenical powder—Oatmeal 1 lb., moist sugar $\frac{1}{4}$ lb., white arsenic and rotten cheese of each 1 oz., rat scent a few drops. Millers

rat poison—Carbonate of baryta $\frac{1}{4}$ lb., sugar and oatmeal each 6 oz., oils of aniseed and carraway of each a few drops. To drive rats away from buildings:—Dissolve 2 oz. of glue, 2 oz. of assafoetida, and 2 oz. of potash in water, and add $\frac{1}{2}$ oz. of phosphorus to the mixture. Then in a trap, baited with cornmeal, scented with oil of anise, catch two or three rats; if they are very numerous more are necessary, since the hair partly off these in such a way as to hurt them as little as possible, then give a slight coating with the above mixture, heated warm, let them loose into their holes, and there will be no more trouble with them for months to come. This mixture will last two years. Another method is:—Take chloride of lime and scatter it dry all round, and into their holes, and wherever they haunt, and they leave at once. In using the poisons mentioned, great care should be exercised to keep children and domestic animals from coming in contact with the mixtures.

Scientific Apparatus and Laboratory Chemicals.

Messrs. Heynes, Mathew & Co., Cape Town, forward a copy of their 1910 illustrated catalogue of Scientific Apparatus and Laboratory Chemicals. It contains complete lists with prices of all the more general requirements, all of which can be supplied from stock. A full index is given at the end, making it an easy matter to find one's requirements.

Farmer's Bookkeeping.

We have received from the author, Mr. E. L. Baker, of Caledon, yet another contribution on the subject of Bookkeeping for Farmers. This consists of a complete treatise on the subject of accounts, entitled "The South African Bookkeeper." Mr. Baker includes in his work a very useful section devoted to Farm Accounts, which should prove both helpful and enlightening to every intelligent farmer desirous of knowing exactly what his production costs and how he stands at the close of each year. While being based on sound accounting lines the system explained is both simple and clear. The whole book is exceedingly informative and is well got up.

DRIED FRUIT AND RAISIN INDUSTRY.

Mr. P. J. Cillic, C.son, writing from Vruchtbaar, Wellington, on the 11th of May, 1910, reports as follows:—

It affords me pleasure to report the following with regard to my labours in the interest of the abovenamed industry during the past season.

As in the previous season, I commenced my work this year by lecturing at Tulbagh, Ceres, Goudini, and Macgregor. Generally those meetings have been well attended by interested farmers. And without doubt these meetings are the forerunners of an awakening interest, and direct attention to the necessity which exists of improving our dried fruit and raisin production, if we do not wish to see ourselves pushed from our own markets by producers thousands of miles distant. And that there is the necessity that we should bestow all our efforts upon the improvement of our own product, is proved by the enormous quantities of raisins, dried fruit, almonds, etc., which are still being imported into South Africa. So, for instance, we see that, while we could scarcely dispose of the produce of our vineyards in the form of wine and brandy at any price, there was imported for consumption in South Africa for the twelve months ending 30th June, 1909, the product of the vine in the form of currants and raisins to the almost inexplicable amount of 1,700,917 lbs. at a value of £20,869. Or in other words we imported one and a half times as much as we produced ourselves in the form of currants, sultanas and raisins. And what do we see under the heading Dried Fruit? Often at the meetings the remark was made: Do we still import dried fruit into our country? Yes, we have imported for the same period from 1st of July, 1908, till the 30th of June, 1909, 604,199 lbs. of dried fruit at a value of £11,468; almonds, 190,251 lbs., at a value of £9,104; nuts, excepting groundnuts, 342,831 lbs., at a value of £6,514. In other words there were imported into South Africa from the 1st of July, 1908, till the 30th of June, 1909, products, which we ought to export to foreign countries, to the amount of 2,911,285 lbs., at a value of £49,318. Has not the time arrived that we should pause and commence asking, where is the fault? And if we add to that £28,342, the value of fresh fruit imported, and £19,477 for bottled and preserved fruit, we obtain a grand total of £97,137, sent out of South Africa in order to pay for articles, which in no country on earth can be produced with more profit than in the South-Western Districts of the Cape Colony.

And that we are capable, if the right methods are adopted and the required care is bestowed upon it, of producing an article, which can compete with the foreign one, the raisin and dried fruit show has recently shown, when not only samples, but tons of various varieties of dried fruit were exhibited, which, without any doubt, might be successfully exhibited in any producing centre of Europe or America, and could

bear comparison with what is produced there. It is, therefore, with satisfaction that I am able to report that the progress in the better preparing of dried fruit and raisins is very satisfactory this year, and has made a much greater leap onward than was the case the previous year. Fortunately the improvement is permanent, and extending by spreading from farm to farm; and often I have noticed with joy how information regarding small improvements in the treatment of raisins and the drying of fruit has spread to places, which have never been visited by me. One of the districts, where undoubtedly the progress has been the largest, is Goudini, in the district of Worcester. Where a few years ago every one was highly satisfied with the quality of his products, and where little thought was given to improvement of those products, there is now a general competition to produce the very best, with the very satisfactory result that both in dried fruit and in raisins an article was produced as never before. Should this competition remain and be encouraged a little, then the ward of Goudini will soon have the honour of not only being the largest producing centre of raisins but also of being by far the best in the Colony. Better methods in the preparation and more care at the work have become so general in that ward that it is the exception to find farms where there has not been improvement during the last few years. And here also, like at other places, the reward for more care and labour has not failed, but has soon been received in satisfactory prices both for dried fruit and raisins.

That the number of exhibits at the raisin and dried fruit show was so very small, is certainly deeply to be regretted, as it brings a centre of population and consumption like the Cape Peninsula, under the impression that it is not possible to produce much, and that for their requirements they will always be dependent on Europe and America. And yet I am convinced, through experience of the last few years, that, if we continue in the road once taken with regard to the planting of fruit trees and vines for raisins, and follow the best methods of preparing with care, we ere long will produce not only sufficient for the requirements of South Africa, notwithstanding our very large imports of those products at present, and further for the increased consumption of an improved article, but we will also have a surplus for export to foreign markets.

A natural result of improving our dried fruit and raisins will be an increased consumption. And, therefore, in my opinion it will not be out of season to improve this occasion in order to thank, in the name of those numbers of producers, with whom I came in contact during my work in the past season, the committee and members of the National Union for the useful work they are doing by continuously drawing the attention of consumers throughout the country to our dried fruit and raisins. The work performed by them is very much appreciated by the producers, and we shall, although slowly yet surely, produce a product, which may be freely recommended by that body.

That there is in the raisins-producing districts a deep-rooted prejudice against the holding of the show at Cape Town, admits of no doubt, and I would suggest to hold the show in future from three to four weeks earlier at one of the most important producing centres, and after the show to exhibit samples of the prize articles, with a statement of the quantities represented by those examples, at Cape Town at a centrally situated place as, for instance, the Chamber of Commerce, where they might be seen daily for two or three months by the consuming public. In that way we will attain a double end. Firstly, the show, being within reach of producers, will be attended by many of them, and become to them a training school, to show them by comparison where there is still room for improvement in the preparation of their products; and if we could have at the

show a collection of samples of the very best dried fruit, say of 25 lbs. each, in order to serve as a standard, such would be a great help in our effort to improve our dried fruit and raisins, and by having an exhibition at Cape Town for a few months the consumption of the Colonial article will be largely furthered. And later on such an exhibition of samples might be held at other places, like Johannesburg, Pretoria, Bloemfontein, etc., and the consuming public have an opportunity of seeing that the quantity and quality of our Colonial article have much improved during recent years; for who would venture to deny that there has been a great improvement? Not as if I wished to maintain that there is no room for further progress in the better preparation of dried fruit and raisins, or that the majority of our producers are perfectly proficient; on the contrary, I have often been disappointed that our progress in adopting better and newer methods has not been quicker. Fortunately, however, although the progress is not as fast as we might wish, the improvement in the districts, visited by me in the last two seasons has been *general*. In conclusion I would very heartily, for their much appreciated help, thank the many gentlemen, who, often at great sacrifice, facilitated my work and assisted me in the various districts which I visited.

A SOUTH AFRICAN BOTANIC GARDEN,

By N. S. PILLANS, Department of Agriculture.

The question of a South African botanic garden, which would serve and be representative of the whole of the sub-continent, is one that can hardly be considered as something new in the minds of botanical students and lovers of Nature in this country. Nor has it been absent from the minds of South African commercial men and farmers, so many of whom have found good reason to desire such an institution; yet remarkably little has been written on this subject. What exists is very brief, and has appeared at wide intervals of time. Many of the writers have allotted to the subject no more than a paragraph or two, and a mere reference to it is the most usual form of occurrence. Within the space of this short article it is impossible to deal with the subject in its entirety, and a mass of detail has to be excluded; but it is to be hoped that a further opportunity of bringing it forward may be given at such future time as circumstances may permit.

During the Eighteenth Century travellers, on their way to and from the East, as a rule spent a few days at the Cape, during which they examined as much as possible of the then little known country, and their writings do not lack appreciation of the wealth of beautiful and interesting plants which they saw here. Then there were also travellers who, in

the latter half of that century, came to the Cape with the object of investigating all the natural products, with which the civilised world was then not well acquainted; and though they discovered so much of remarkable interest in the animal kingdom, yet they were unanimous in their appreciation of the bewildering variety of plant life found in this country. At the present time many visitors are in the same manner struck by the beauty and interest of what little of the flora they are able to see. It was through the instrumentality of these pioneer naturalists that the more beautiful of the Cape plants found their way into France and Holland, from whence their culture spread over to England, and there became very much of a fashion with collectors of exotics. Before the close of the eighteenth century the richness of the Cape flora was well recognised in England; the cultivation of bulbs and heaths being carried to a high state of perfection. The then ruling Sovereign was apparently as keen as any of his subjects in the growing of these plants. This assumption is deduced from the fact that he despatched a special gardener to procure an assortment of the most beautiful and curious plants obtainable here, in order that the glass houses at Kew might be well filled with these new wonders. This action on the part of Royalty naturally gave a great impetus to the craze in England and on the Continent for Cape plants, and resulted in many wealthy collectors expending considerable sums in purchasing the rarest specimens to be had. The demand thus created was so great that a regular trade in bulbs and seeds became established; but towards the middle of last century there came a change in the fashion of hot-house plants, and it was then that this trade began to decline, until it almost disappeared. However, there is still a remnant, and by encouragement from the institution now advocated, it might be fostered till the Cape flora has regained its former popularity, by means of the advertisement which that institution would give it.

Strangely enough, at about the time when cultivators were losing interest in Cape plants, which was partly due to difficulties experienced in their cultivation, collectors were commencing to search systematically for specimens, and students were beginning to build up a better form of classification than previously existed. This may account for the fact that most of the reliable works on the subject, which are used to-day, date from that period. Not until these investigations had been in progress for some years could it be said that the magnitude of the variety of plants or their distribution in this country was even fairly well known to botanists. The amount of new material at this time brought to the notice of science was enormous, and it had the effect of completely verifying the assertion that the vegetation of South Africa was one of the richest in the world. This richness, it may be mentioned, applies not only to the number of species, but also to the possession of rare and ancient types and an unusually large proportion of attractive plants, which fact is almost daily receiving additional proof in the shape of fresh discoveries made through private enterprise in localities thought to be already exhausted.

This country does not at present possess any public garden which can be considered as exclusively South African in type; nor has it any public garden where preference is given to the indigenous flora, or any serious attempt made to display the wealth of the flora; therefore it is evident that it is without an institution where the proper attention is devoted to native plants. Visitors to South Africa are not unable to gain any idea of the vast variety of beautiful plants growing wild in this country, simply because there is no public garden in which these people may see a fair representation of the flora. Men of science in other lands are amazed at the apathy shown by South Africans towards the rare works of Nature with which this country is so bounteously gifted, and for which it is world

famed. If inquiry be made into the neglect to utilise the native plants, it will be found that the principal reason for such neglect lies in the ignorance of cultivators as to what the sub-continent possesses in plants of economical and ornamental value, and further it will be found that there is a lamentable want of knowledge in the general treatment (especially in regard to the most suitable means of propagation) required by these plants while in cultivation. The latter fault is somewhat excusable, however, in the circumstances prevailing. At present this ignorance cannot be easily dispelled, chiefly because the knowledge with which to substitute it is not available, and also because there is as yet no source from which that knowledge can be obtained by all who require it. These are a few of the simple but significant reasons which have caused so many visiting and resident horticulturists as well as students of the flora to advocate the establishment of a South African botanic garden.

The garden now urgently required is one which will supply certain of the present needs of science and horticulture, be the means of widening the scope and facilitating the pursuit of botanical research, as well as for investigating the properties and encouraging the use of commercially valuable native plants. It must also be the means of making the cultivation of Cape ornamental plants more popular, and at the same time providing instruction in their treatment. Arrangement of plants for effect should also receive attention. But above all other essentials, if the garden required can be obtained, is the one that it shall be a thorough exposition of what is best in the flora of the Cape.

It being advisable, as well as the general custom, to have an herbarium attached to a national garden, so as to facilitate research work and bring all horticultural and botanical affairs under one establishment, the proposed garden would be a most suitable permanent residence for the existing Government herbarium which, though in its present position scientifically valuable to searchers after knowledge, yet is deserving of more congenial surroundings than those in which it is now placed, and requires to be associated with an attractive garden in order to gain for itself a greater interest from the ordinary lover of flowers who should be encouraged to appreciate the work of students.

With regard to the situation of the garden; this is a matter on which, for various reasons, no decided opinion can be given here. The principal reason is, that those who have considered the matter are still undecided as to the most suitable site, hence there is as yet no agreement upon this question. Then also, it is still a question whether one garden will suffice for the needs of the diversified flora of South Africa. In the opinion of the writer one will not suffice, time will prove the necessity for more; but before then let one be started on a small scale in a spot easily accessible to the public and such as will suit the requirements of those plants growing in the richest floral region.

This institution should take its proper share in assisting to frame measures for the protection of native plants, and by itself should propagate and re-establish many which are now on the verge of extinction; but preservation of the flora as a whole may be best secured by the creation of preserves in the various parts of the country where each type can be best suited.

Many persons may be in doubt as to who should create this garden and who should maintain it. But surely it is the duty of the governing body in any State to provide or assist in providing out of the public funds a national institution such as this garden must be, if conducted on the right lines. The initial cost need not be great, in fact it ought not to be, because it is advisable that an undertaking of this kind should start on a

small scale and expand only as the necessity arises. Material, in the shape of specimens for cultivation, is bound to come readily to hand from willing donors in all parts of the country when once this good work is brought to their notice. Being under Government, the establishment would, of course, receive a grant from that body; but it has been found to be the case throughout the world that if such a grant were insufficient, the need of running a nursery in conjunction with the garden, in order to defray part of the expenses, could not be avoided.

Those who have had experience in the management of botanic gardens hold the opinion that no nursery trade, carried on for the sole purpose of defraying expenses, should ever be connected with the institution, because such a trade, in various ways, tends to alter the character of the garden and divert the work from that proper course for which the garden should exist. But no one will deprecate the usual system of exchanging plants and seeds with other establishments, for it is very often by this system only that material of certain species may be obtained; nor would the sale of plants or seeds under particular circumstances be considered as detrimental to the legitimate work. There are many gardens which, through having entered the nursery trade, have lapsed into trading establishments or mere places of convenience for the lounge, and which are maintained just within that state of decency which satisfies the ordinary stroller. Perhaps a contribution towards costs might be forthcoming from one or two of the South African science societies; and it would be as well if, in return for their contributions, and in order to ensure a permanent policy of management, they were given a voice in the administration of the institution. No matter who supplies the grant, or who administers it, it is desirable that a body of guardians be formed whose duty it would be to see that the original intentions, for which the garden was established, were being carried into effect.

The garden, once established, would immediately commence to add to the little stock of knowledge now in hand, and by accumulating scientific data, investigating and assisting farmers and others in the utilisation of economic native plants, and recording practical experience in general horticulture, as well as popularising and encouraging the cultivation of the most beautiful of the indigenous plants, it would serve every reasonable demand that could be made of any botanic garden.

ARGEMONE MEXICANA OR MEXICAN POPPY.

By N. F. PILLANS, ECONOMIC PLANT INVESTIGATOR.

An annual plant, 1 to 3 feet high. Stems spreading, grey, beset with smooth straw-coloured spines. Sap a yellow sticky juice. Leaves alternate on the stems, 4 to 10 inches long, oblong, crimped, indented almost to midrib, bluish-grey with green edges, having a spine, as above, at the tip of each segment and similar spines on the under sides of the midribs and lesser ribs. Flowers produced singly or in clusters of 2 to 4 at the ends of the branches, cup or saucer shaped, 1 and half to 2 inches across, composed of six spatulate petals varying from cream to yellow in colour, surrounding the young pod and a mass of yellow stamens. Pods erect, 5 celled, longitudinally 5 grooved, sparsely covered with straight spines as on leaves and stems; when unripe, pods dark green, oblong, acute at both ends; when ripe, pods light brown, split open from the apex down the grooves for about a third of their length. Seeds numerous, black, almost round with a slight ridge on one side, rough and hard.

This plant, a member of the Order Papaveraceae or Poppy Family, was introduced from America and has now extensively spread itself over the central and eastern parts of Cape Colony, so as to become a noxious weed. It occurs chiefly in dry sluits and on river banks, and is sometimes to be found closely covering patches of open veld on the flats. Its occurrence in crops seems to vary with the nature of the crop, cereals appearing to be its favourites. In places where the Poppy has stood for several years the grass and other valuable vegetation of low growth is injuriously affected by its dense habit and considerable exhaustion of moisture in the soil. The enormous quantity of seed produced in a season and the readiness with which it germinates under adverse conditions, together with the assistance of flood waters, is causing this weed to enter areas hitherto clean, so that, if not checked, it is but a matter of time, by no means long, for the greater part of this Colony to become infested.

The surest method of eradication, as with most annuals, is to tackle the plant before its seeds are developed, or in preference before the expansion of the flowers takes place. While young, the stems are easily severed just below the ground by a spade or hoe. A severance of the stem an inch below ground will prevent further growth. These implements are more suitable than ploughs and harrows for carrying out the destruction on the veld, since not only are the latter too unwieldy for the narrow and uneven places frequented by the Poppy, but by their loosening of the soil the growth of other weeds is encouraged. Fallow lands should be gone over with the cultivator while the plants are still young. Some difficulty will most likely be experienced in tackling the weed as it stands in crops. In such cases hand pulling or hoeing will assist, but if any particular patch of arable land is severely infested, as is often the case with this weed, it may be expedient to keep it fallow for a season or two so as to facilitate the work of eradication. Should regular operations of the kind advised be carried out during spring it may become possible to keep the plant within certain limits, but, not until there is combined action and until those farmers situated at the sources of natural drainage systems give the matter proper attention, can we hope for anything like total eradication.

Beyond the report that the young leaves of the Poppy are sometimes eaten by ostriches there is no knowledge of the plant serving as a feed. It is, however, of some economic value, for in India the yellow sap is used medicinally and in America an anaesthetic is extracted from the seeds.



THE MEXICAN POPPY—(*Argemone Mexicana*.)

Reduced about half size. The flower is shown spread out at the right of the illustration.

CARBON BISULPHIDE FOR GRAIN INSECTS.

By CHAS. P. LOUNSBURY, Government Entomologist.

SUMMARY.

Fumigation with carbon bisulphide is the best commercial means for destroying weevils and other insects in stored maize, etc., without destroying the vitality of the grain.

The grain should be stored in bins, tanks, or other receptacles, that will be practically air-tight when closed.

Use at least eight pounds of bisulphide to each 1000 cubic feet. This is about equal to one pound (20½ fl. oz.) to 85 bushels (56 lbs.) or 24 bags (200 lbs.).

Expose the liquid in shallow dishes or sprinkle it over the surface of the grain. It evaporates and diffuses through the mass. Treatment with the temperature of the grain under 60 degrees F. is very likely to be unsatisfactory and is not recommended. It is desirable that the temperature be above 70 degrees.

The eggs are most resistant to the treatment. Therefore the remedy should be used when fewest eggs are probably present, that is without delay when the insects are noticed, or as quickly as practicable after the harvest if the treatment is to be precautionary.

There is danger of an explosion and fire if a spark or burning light is brought near the vapour or a space undergoing treatment.

This memorandum is prepared to meet many requests for directions in regard to destroying weevils with carbon bisulphide. Numbers of the *Agricultural Journal* in which the subject was previously discussed are no longer available for distribution.

Although little used as yet in South Africa, carbon bisulphide has for a number of years been acknowledged as the simplest, most effective, and least expensive of the many agencies anywhere recommended and used for the destruction of weevils and other grain-infesting insects. As supplied by chemists, it is a heavy, colourless liquid, which, owing to impurities, generally possesses a penetrating and vile odour. The liquid rapidly changes to a heavy vapour when exposed to the air at ordinary temperatures, and to this property is largely due its utility as an insecticide. The vapour is very inflammable and highly poisonous to animal life.

Grain to be treated should be in a receptacle that can be made practically air-tight. Recent American experiments (Hinds and Turner, *Journal Econ. Ent.*, Vol. 3, No. 1) have demonstrated that the treatment is most effective when a high summer temperature prevails, that is when the insects are most active, and that even a very heavy dosage may prove unsatisfactory when the temperature is lower than 60 degrees F. Treatment with the temperature at 67 to 70 degrees in the experiments resulted in the destruction of all stages of the ordinary weevil (*Calandra oryza*), when treatment at 60 to 65 degrees with the same dosage resulted in the destruction only of 60 to 70 per cent. of the insects. Therefore, if carried out in winter, a warm spell of weather should, when practicable, be

selected for the work. It should be borne in mind, naturally, that the mean temperature of a mass of stored grain is much more constant than that of the outside air, and that it may be greater because of internal "heating" if the grain becomes at all damp.

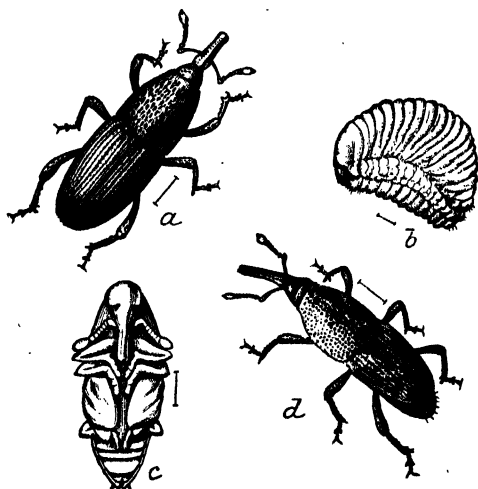
The ideal way to apply the chemical is to pump a stream of air through it, thus evaporating it rapidly, and to discharge the vapour-burdened air through a perforated pipe into the mass of grain. This method, however, requires the use of an air pump and other special apparatus, and is not used in practice. Instead it is customary to expose the liquid in shallow dishes or on cotton waste or other absorbent material on a surface of the grain, or to sprinkle it directly over the surface. If there is a depth of more than five feet of the grain, it is a good precaution to put part of the charge deep into the mass at one or more places, either by pouring it in through a pipe or by burying material soaked in it. The tank, or bin, or whatever the receptacle is, should then be closed tightly and left undisturbed, in order that the vapour may diffuse throughout

the mass. Open-topped receptacles may be closed with tarpaulins or heavy bags and boards. The more leakage is prevented the better are the conditions for success, and it has to be remembered that as the vapour is heavier than air it tends to sink downward at first.

It is customary to keep the space closed for at least 24 hours, and if the vapour may have taken many hours to become diffused, as is likely to be the case when a large bulk of grain is treated as a unit, it is preferable to leave it two or three days. When the receptacle is opened, the vapour gradually diffuses into the air. The chief objections to more pro-

longed exposure is the increased risk of an accident through the presence of the explosive gas being lost sight of and the risk of affecting the germinating power of the grain.

The quantity of the liquid generally recommended is one pound to 100 bushels (56 lbs.) of grain. This is about equal to $6\frac{1}{2}$ pounds per 1,000 cubic feet occupied (allowing 2,747 cub. in. to a bushel), or one pound to 28 200 lb. bags. The American experimenters above referred to state the five pounds to 1,000 cubic feet used in tight compartments at a temperature above 70 degrees F. is effective, but it seems inadvisable to trust to less than, say, eight pounds in practice. This means one pound to about 85 (56 lb.) bushels, or 24 bags. If the conditions are at all unfavourable, a greater quantity, even to double or more, should be used. One pound to 40 bushels is a proportion very commonly recommended for ordinary grain bins on American farms. Even this amount may give disappointing results in cold weather. A pound of the liquid measures about 20 $\frac{1}{2}$ fluid ounces, that is, a trifle more than an imperial pint, or about two-thirds of a wine bottle. The large, circular, metal tanks in which grain



Grain Weevils. *a*, *Calandra granaria*, adult; *b* and *c*, larva and pupa of same; *Calandra oryzae*, adult. (Chittendam in 1894 U.S. Dept. Agr. Year Book.)

is commonly stored in South Africa should lend themselves well to the use of carbon bisulphide. The approximate cubical content is easily obtained

by the formula $\frac{22}{7} \times \frac{\text{diameter}}{2} \times \frac{\text{diameter}}{2} \times \text{height}$. Thus a tank ten feet high and ten feet in diameter contains $\frac{22}{7} \times 5 \text{ ft.} \times 5 \text{ ft.} \times 10 \text{ ft.}$, or about 786 cubic feet, equal to about 500 bushels or 140 bags.

The eggs of the insects have been found more resistant to the vapour, under ordinary circumstances, than the beetle or the grub. A generation has been found to occupy about six weeks at least. Hence if living weevils are found in grain after a treatment, it would be well to dose the mass a second time about six weeks after the first treatment, that is when eggs are likely to be least numerous. Eggs are little likely to be abundant at the time grain is shelled, as by that time eggs laid in the field are likely to have hatched. Therefore, if weevils are expected, an early treatment is desirable.

The vapour of carbon bisulphide is inflammable. Tests by the United States Bureau of Chemistry have shown that a mixture with air as dilute as is formed by five pounds of the liquid in 1,000 cubic feet of space will burn, and that one doubly as strong, though much more inflammable, is scarcely strong enough to explode. Mixtures at the rate of about twenty pounds to 1,000 cubic feet, however, were found strongly explosive, and mixtures with a much greater proportion of vapour proved decreasingly explosive. It is clear that as the vapour forms and begins to mix with air, there is considerable risk of an explosion if anything is at hand to bring about ignition. Therefore no one should be allowed to bring a flame or burning object of any kind, not even a lighted pipe or a cigarette or anything liable to produce a spark, near where the vapour is being formed, and the same precaution should be observed when a treated space is being ventilated. A temperature of 300 degrees is liable to ignite the vapour as well as a flame. Notwithstanding the inflammability of the vapour, however, accidents appear to be very rare in its use as a fumigant for stored grain or for mills, store-houses, etc., and a man should not hesitate to adopt the remedy if he is prepared to have a trustworthy person to supervise its use. The terms of some insurance policies may, nevertheless, forbid its employment.

Danger of injuring the germinating power of grain by carbon bisulphide seems confined to exceedingly long exposures. Eight years ago Mr. C. W. Mally, now Eastern Province Entomologist, conducted several series of tests to get information on this phase of the subject. Mealies and barley were found to be little affected after six months' exposure to a strength of eight pounds to 1,000 cubic feet in a sealed tin. Wheat showed no deterioration at the close of two months, but distinct deterioration at the close of three. Oats showed deterioration after six months, but even then germinated to the strength of 80 per cent. In a duplicate test, oats, like wheat, showed injury in three months. In another series of tests, wheat and oats were exposed in specially made tins of one cubic foot capacity to the strength of 16 lbs. of bisulphide to 1,000 cubic feet. The grain in the tin opened at the end of the first month germinated practically as well as untreated grain, but that in the tin opened at the end of two months proved materially injured. The germination at the end of six months was 72 per cent. for wheat and 77 per cent. for oats, against 91 per cent. and 93 per cent. for control lots germinated at the same time. It is evident that grain is little likely to be injured in practical work, even if the precaution to ventilate the space be neglected.

Experiments conducted by the United States Department of Agriculture have shown that some seeds, especially of some kinds of grasses, are more delicate than grain with respect to injury by the vapour, but that in most cases a strength equal to that formed by eighty pounds of the liquid to 1,000 cubic feet does little or no injury in twenty-four hours. Exposure for two days to this strength (approximately) seriously affected some grasses, but did no harm to most of the many kinds of seeds that were used.

Carbon bi-sulphide is ordinarily sold by wholesale chemists. It costs very little where it is manufactured, but the expenses of importation, coupled with the lightness of the demand at present, necessitates the charging of a rate which might seem high in Europe or America. It is quoted in Cape Town at 1s. 3d. per pound for small quantities, and at 1s. or slightly less for large quantities. Some years ago the Government imported a very large quantity for use against phylloxera in vineyards. About 100 drums of this remain at Groot Constantia, and it is now offered to farmers in drum lots at 6d. per pound, plus 4s. for the drum and 5s. 6d. per drum for transport to the Wynberg Railway Station. The drums originally contained about 2 cwt. of the liquid, but the quantity now ranges from about 90 lbs. to 200 lbs. Applications to purchase one or more drums are received by the Under Secretary for Agriculture, Cape Town. Prepayment of charges is required. In response to a special enquiry, the Chief Traffic Manager's Office states that if consigned as "disinfectant," and at owner's risk, the drums will be conveyed at the 3rd class rate over the Government railways.

It may be useful to state, in connection with this subject, that the success of metal tanks for the prevention of weevils in grain is probably dependent upon their exclusion of moisture, and is not, as many farmers think, because air is excluded. That weevils require some degree of moisture was admirably demonstrated by Mr. F. J. Cole in an elaborate series of experiments which he conducted a few years ago at the instance of a Liverpool firm largely interested in grain importation. The experiments are discussed in No. 2 of Vol. 1 of the *Journal of Economic Biology*. It was found that the weevils would survive a long time in grain practically exhausted of air, and also for many days in an atmosphere containing 80 per cent. of carbon dioxide. When kept in a dry atmosphere with other conditions favourable, the weevils were very unthrifty; but when provided with a little moisture they increased rapidly and fed voraciously, although every other condition was the same. Mr. Cole concludes his article with the following paragraph:

"Speaking generally, my experiments with grain weevils entirely support what I believe to be the general opinion of the trade with regard to these destructive animals. Much grain is brought to this country after a long voyage in sailing vessels which have to pass twice through the tropics. It seems to be the general experience of marine surveyors that no cargo ever arrives that is *absolutely free* from weevil. It is therefore important that the ravages of the insect should be confined to within as narrow limits as possible. This is done by stowing the grain in sacks, and by thorough ventilation of the cargo. These precautions of course result in keeping down the temperature and in carrying off water vapour, and are certainly the best that could be followed."

MANURING WHEAT IN THE HUMANSDORP DISTRICT.

EXPERIMENTS CONDUCTED UNDER THE SUPERVISION OF K. M. JOHNSEN, ASSISTANT TO THE GOVERNMENT AGRICULTURIST.

In 1908-09 a number of experiments were conducted in the Longkloof, with a view to ascertaining the best combination of fertilisers to use for wheat. During the past season similar experiments were carried out on various farms in the Humansdorp district. The plots of land selected were in each case treated as though part of an experiment station, the same careful supervision being exercised throughout. That is to say, the land was measured up, sown, worked, cared for and reaped, and the results taken, the only difference being that a great variety of soils are thus tested, and the result of the work brought home to the farmer on his own farm.

In England an average crop of wheat—30 bushels—is calculated to remove from the soil, in lbs. per acre, the following quantities of plant food:—

	Nitrogen.	Phosphoric Acid.	Potash.
In the grain (30 bushels)	34	14·2	9·3
In the straw (2,653 lbs. (dry)) ...	16	6·9	19·5
Total Crop	50 lbs.	21·1 lbs.	28·8 lbs.

Taking the average of our three unmanured plots at 440 lbs. grain and 704 lbs. straw, and using these figures we find that a crop of this size would remove from the soil, in lbs. per acre, the following quantities of:

	Nitrogen.	Phosphoric Acid.	Potash.
In the grain	9·7	4·1	2·7
In the straw	4·2	1·8	5·2
Total Crop	13·9 lbs.	5·9 lbs.	7·9 lbs.

The full dressings in lbs. per acre as calculated to supply the following quantity of:

	Nitrogen.	Phosphoric Acid.	Potash.
200 lbs. Superphosphate, 18 per cent.	—	36	—
100 lbs. Govt. Guano	12	12	2·2
20 lbs. Sulph. of Potash	—	—	9·6
100 lbs. Nitrate of Soda	15·6	—	—
	27·6 lbs.	48 lbs.	11·8 lbs.

If the art of manuring consisted simply in providing plant food in the proportions in which it was taken from the soil by the crop, it would be a very easy matter to arrange. There is, however, always the disturbing element of varying soil and climate to be reckoned with, and it is to arrive at some normal dressing which will place a sufficiency of available plant food at the disposal of the crop and prevent impoverishment that our experiments are conducted. The soils of the Humansdorp district are known to be poor in Phosphoric oxide, and it is therefore not surprising that the Phosphatic manures, Superphosphate and Basic Slag, show such good results.

The crop from the unmanured plots converted into bushels would be an 8 bushel crop, or less than one-third of the average crop of the United Kingdom, and just a bushel in excess of what is estimated to be the

average for the Colony. For the benefit of those not accustomed to working in bushels, the unsatisfactory yield will be at once apparent when it is stated that, assuming 50 lbs. of wheat were sown to the acre, there is a return of nine to one. By the use of fertilisers this yield has been increased as much as threefold, and this can hardly be wondered at when the quantity of plant food put into the soil by these fertilisers is remembered. The growing of wheat in areas of which these farms are representative, is reduced to an unprofitable undertaking in the absence of the judicious use of artificial fertilisers or kraal manure, no matter whether the poverty of the soil is due to continuous cropping or to its natural condition. As stated in the previous report on manurial experiments in the Longkloof, kraal or farmyard manure is the best all-round manure when it can be secured at a reasonable figure. Owing to the difficulty of securing kraal manure cheaply enough resort must be had to artificials; and in view of the costliness of these, if not applied in the correct proportions, experiments are conducted to ascertain which combination will yield a substantial profit, and at the same time supply the largest amount of the ingredients taken out of the soil by the crop. There is a considerable quantity of fertiliser used in the Humansdorp and the Longkloof districts, but largely single ingredient fertiliser. Now, while this may yield a substantial profit for the first year, and perhaps for two or three years, or even a longer period after, it is bound to spell soil **exhaustion** in the end. Crops on lands fertilised in this fashion will **continue** to make the best use of the single ingredient fertiliser only so long as they are able to find the other indispensable requirements in the soil in the correct proportion; and so soon as they are unable to do this, no quantity of single ingredient fertiliser will make any difference to the plant growth.

The quantity of fertilisers applied in the following experiments are shown in lbs. per acre as well as the results obtained. The increase shown in each manurial plot is the quantity over and above that obtained on the unmanured plot No. 1, and in order to arrive at the profit, the value of the manure applied to the manured plots is deducted from the value of the surplus.

M. C. Swart, Bushkloof, District Humansdorp.

Plot.	Manurial Treatment.	Yield per acre.		Increase in yield.	Value of increase @ 9/- per 100 lbs.	Cost of Manure.	Profit.	Loss.
		Total.	Grain.					
	lbs.	lbs.	lbs.	lbs.	£ s d.	£ s d.	£ s d.	£ s d.
1	No Manure ...	1240	372	...	...	...	...	...
2	200 Superphosphate ...	2045	736	364	1 12 8	0 10 6	1 2 2	...
3	200 Basic Slag ...	2140	771	399	1 16 0	0 8 6	1 7 6	...
4	100 Nitrate of Soda ...	1320	396	24	0 2 2	0 16 0	...	0 13 10
5	200 Basic Slag ...	2160	756	384	1 14 6	1 13 2	0 1 4	...
	100 Government Guano ...							
	20 Sulphate of Potash ...							
6	100 Nitrate of Soda ...	2400	840	468	2 2 0	1 15 2	0 6 10	...
	200 Superphosphate ...							
	100 Government Guano ...							
7	20 Sulphate of Potash ...	2180	741	369	1 13 1	1 6 6	0 6 7	...
	100 Nitrate of Soda ...							
	200 Superphosphate ...							
8	200 Basic Slag ...	1880	658	286	1 5 8	1 4 6	0 1 2	...
	100 Nitrate of Soda ...							
	20 Sulphate of Potash ...							
9	100 Nitrate of Soda ...	1335	401	29	0 2 7	0 18 8	...	0 16 1

Zwart Aar wheat was sown in conjunction with the fertiliser on old or long-worked dry land of a sandy nature on the 23rd of July. Nitrate of Soda was applied as a top dressing on the 10th October and the crop reaped on the 22nd December. In this experiment the application of the Phosphatic manures, Basic Slag and Superphosphate, shows up extremely well. The Slag, in fact, has done better applied alone than when in combination with Nitrate of Soda, and almost as well as the complete dressing. Plots 5 and 6 show good returns, but do not yield the profits of plots 2 and 3 this year. They have a much higher residual value than the latter, however, and the results would probably show next year.

R. H. Pattle, Neliannah, District Humansdorp.

Plot.	Manurial Treatment.	Yield per acre.		Increase in yield.	Value of increase @ 9/- per 100 lbs.			Cost of Manure.			Profit.			Loss.		
		Total	Grain.													
	lbs.	lbs.	lbs.	lbs.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1	No Manure ...	1236	528	...	3	2	2	0	10	6	2	11	8	...	...	...
2	200 Superphosphate ...	2380	1220	692	1	17	0	0	8	6	1	8	6	...	...	...
3	200 Basic Slag ...	1823	910	412	...	...	...	0	16	0	...	...	...	0	16	0
4	100 Nitrate of Soda ...	1380	456	...	...	...	...	...	...	...	...	...	...	...	...	...
5	200 Basic Slag ...	1936	872	344	1	11	0	1	13	2	...	...	0	2	2	...
	100 Government Guano ...															
	20 Sulphate of Potash ...															
6	100 Nitrate of Soda ...	2212	936	408	1	16	8	1	15	2	0	1	6	...	...	...
	200 Superphosphate ...															
	100 Government Guano ...															
	20 Sulphate of Potash ...	1616	732	204	0	18	4	1	6	6	...	...	0	8	2	...
7	100 Nitrate of Soda ...															
	200 Superphosphate ...															
8	100 Nitrate of Soda ...	2120	1012	484	2	3	6	1	4	6	0	19	0	...	...	...
	200 Basic Slag ...															
	100 Nitrate of Soda ...															
9	20 Sulphate of Potash ...	1068	432	...	...	...	...	0	18	8	...	...	...	0	18	8
	100 Nitrate of Soda ...															

The land used in this experiment was a heavy loam under grain the previous year.

Du Plessis wheat was sown with the fertilisers, and harrowed in on the 20th July. Nitrate of Soda was applied on the 11th September and the crop reaped on the 28th December, 1909. The exceptional large yield shown in plot 2 is attributed to the fact that a large ant-heap was broken up and levelled on this plot. As in the previous experiment, the Phosphatic manures have yielded excellent results.

John Muller, Kabeljauws, District Humansdorp.

Plot.	Manurial Treatment.	Yield per acre.		Increase in yield.	Value of increase @ 9/- per 100 lbs.	Cost of Manure.	Profit.	Loss.
		Total.	Grain.					
	lbs.	lbs.	lbs.	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	No Manure ...	956	420	...	...	...	...	...
2	200 Superphosphate ...	1563	749	329	1 9 7	0 10 6	0 19 1	...
3	200 Basic Slag ...	1580	790	370	1 13 4	0 8 6	1 4 10	...
4	100 Nitrate of Soda ...	920	386	...	...	0 16 0	...	0 16 0
5	200 Basic Slag ...	1380	718	298	1 6 10	1 13 2	...	0 6 4
	100 Government Guano ...							
	20 Sulphate of Potash ...							
6	100 Nitrate of Soda ...	1308	629	209	0 18 9	1 15 2	...	0 16 5
	200 Superphosphate ...							
	100 Government Guano ...							
7	20 Sulphate of Potash ...	1328	611	191	0 17 3	1 6 6	...	0 9 3
	100 Nitrate of Soda ...							
	200 Superphosphate ...							
8	200 Basic Slag ...	1345	646	226	1 0 3	1 4 6	...	0 4 3
	100 Nitrate of Soda ...							
	20 Sulphate of Potash ...							
9	100 Nitrate of Soda ...	895	430	10	0 0 10	0 18 8	...	0 17 10

The land selected for this experiment was irrigable sandy loam. It had carried a previous crop of Sweet Potatoes. 50 lbs. of Zwart Aar wheat per acre was sown and harrowed in with the fertilisers on the 23rd July, the plots receiving Nitrate of Soda, were top dressed with Nitrate of Soda on the 10th October and the crop reaped on the 22nd December. The Basic Slag plot has in this experiment given the greatest return both in crop and in profit, better even than the complete dressing, and when it was used in combination with Nitrate of Soda. The next best result is from the plot receiving superphosphate alone.

K. Meldal Johnsen, The Willows, District Humansdorp.

Plot.	Manurial Treatment.	Yield per acre.		Increase in yield.	Value of increase @ 9/- per 100 lbs.	Cost of Manure.	Profit.	Loss.
		Total.	Grain.					
	lbs.	lbs.	lbs.	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	No Manure ...	424	76	...	...	...	...	...
2	200 Superphosphate ...	1148	241	165	0 14 9	0 10 6	0 4 3	...
3	200 Basic Slag ...	972	155	79	0 7 1	0 8 6	...	0 1 5
4	100 Nitrate of Soda ...	404	72	...	...	0 16 0	...	0 16 0
5	200 Basic Slag ...	1508	331	255	1 2 11	1 13 2	...	0 10 3
	100 Government Guano ...							
	20 Sulphate of Potash ...							
6	100 Nitrate of Soda ...	1620	272	196	0 17 8	1 15 2	...	0 17 6
	200 Superphosphate ...							
	100 Government Guano ...							
7	20 Sulphate of Potash ...	1556	326	250	1 2 6	1 6 6	...	0 4 0
	100 Nitrate of Soda ...							
	200 Superphosphate ...							
8	200 Basic Slag ...	1256	238	162	0 14 6	1 4 6	...	0 10 0
	100 Nitrate of Soda ...							
	20 Sulphate of Potash ...							
9	100 Nitrate of Soda ...	424	76	...	...	0 18 8	...	0 18 8

This experiment was conducted on sandy soil which had been used for grain crops for several years. 50 lbs. Medeah wheat per acre were sown and harrowed in at the same time as the fertilisers on the 18th May. Nitrate of Soda was applied as a top dressing on the 31st August and the crop was reaped on the 2nd of December.

Superphosphate alone was the only plot which gave a profit. The complete dressing as well as the phosphatic manures, with a top dressing of nitrate of soda, gave heavier crops but not in proportion to the cost of the fertilisers. A very light crop was obtained from these manurial plots owing to the wheat having been badly attacked by rust two months before reaping.

The following table shows the summary of the experiments. In making these calculations only three experiments have been taken into account; the one conducted at Mr. Johnsen's own experimental centre. The Willows, having been omitted on account of the serious ravages of rust.

Summary of the Wheat Manuring Experiment, Humansdorp District.

Plot.	Crop Returns per acre.		Increase in yield.	Proportion of Grain to Straw.	Value of increase @ 9/- per 100 lbs.	Cost of Manure.	Profit.	Loss.
	Total.	Grain.						
	lbs.	lbs.	lbs.		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	1144	440	...	1 to 1.6	...	...	...	...
2	1996	902	462	1 " 1.2	2 1 6	0 10 6	1 11 0	...
3	1849	834	394	1 " 1.2	1 15 5	0 8 6	1 6 11	...
4	1207	413	...	1 " 1.9	...	0 16 0	...	0 18 5
5	1825	782	342	1 " 1.3	1 10 9	1 13 2	...	0 2 5
6	1773	802	362	1 " 1.2	1 12 6	1 15 2	...	0 2 8
7	1708	695	255	1 " 1.4	1 2 11	1 6 6	...	0 3 7
8	1782	772	332	1 " 1.3	1 9 10	1 4 6	0 5 1	...
9	1099	421	...	1 " 1.6	...	0 18 8	...	1 0 4

One glance at this table will show that only in three of the nine plots were profits secured, namely in the Superphosphate, the Basic Slag and the Slag in combination with Nitrate of Soda. In all the other plots losses ranging from 2s. 5d. to 20s. 4d. were incurred. The Nitrate of Soda has given very disappointing results. It has shown a loss in every plot where it was applied, with one exception. It is the most expensive manure, and its inclusion has certainly not been justified by these results, at least not the quantity used, viz., 100 lbs. per acre. In our experiments this year a considerable reduction in the Nitrate of Soda will be made.

MANURIAL EXPERIMENT WITH OATS: HUMANSDORP DISTRICT.

By K. MELDAL JOHNSEN, Assistant to the Government Agriculturist.

In conjunction with the wheat manurial experiment conducted in the Humansdorp district three similar experiments with oathay were carried out during the past season.

The following tables show the actual results obtained.

G. R. Christie, Chatten, District Humansdorp.

Plot.	Manurial Treatment.	Crop in lbs. per acre.	Increase in yield.	Value of in- crease @ 3/6 per 100 lbs.	Cost of Manure.	Profit.	Loss.
	lbs.		lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	No Manure ...	1832	...	...	...	...	...
2	200 Superphosphate ...	3612	1780	3 2 3	0 10 6	2 11 9	...
3	200 Basic Slag ...	2888	1056	1 17 0	0 8 6	1 8 6	...
4	100 Nitrate of Soda ...	1732	...	...	0 16 0	...	0 16 0
5	200 Basic Slag ...	3628	1796	3 2 10	1 13 2	1 9 8	...
	100 Government Guano ...						
	20 Sulphate of Potash ...						
	100 Nitrate of Soda ...	3668	1836	3 4 4	1 15 2	1 9 2	...
6	200 Superphosphate ...						
	100 Government Guano ...						
	20 Sulphate of Potash ...	3400	1568	2 14 11	1 6 6	1 8 5	...
	100 Nitrate of Soda ...						
7	200 Superphosphate ...						
	100 Nitrate of Soda ...	3132	1300	2 5 6	1 4 6	1 1 0	...
8	200 Basic Slag ...						
	100 Nitrate of Soda ...						
	20 Sulphate of Potash ...	1964	132	0 4 8	0 18 8	...	0 14 0
9	100 Nitrate of Soda ...						

The ground selected for this experiment was sandy loam, and an old stubble land. The fertilisers were applied and harrowed in on the 27th May, but for want of rain the seed—80 lbs. Algerian oats per acre—was not sown before 9th of July. Nitrate of Soda was applied as a top dressing on the 9th of September and the crop reaped on the 30th November.

The Superphosphate alone and in combination with Nitrate of Soda gave better results than Basic Slag, though in the complete dressing there is nothing to choose between the two. Neither the Nitrate of Soda nor the Sulphate of Potash seems to have been responsible for any increase in yield. The complete dressings, though giving the largest increase, do not shew the most profitable returns.

P. H. Rademeyer, Hendriks Kraal, District Humansdorp.

Plot.	Manurial Treatment.	Crop in lbs. per acre.	Increase in yield.	Value of in- crease @ 3/6 per 100 lbs.	Cost of Manure.	Profit.	Loss.
	lbs.		lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	No Manure ...	1816	...	...	...	...	...
2	200 Superphosphate ...	3196	1380	2 8 6	0 10 6	1 18 0	...
3	200 Basic Slag ...	2764	948	1 13 3	0 8 6	1 4 9	...
4	100 Nitrate of Soda ...	2280	464	0 16 3	0 16 0	0 0 3	...
5	200 Basic Slag ...	...	...	...	...	...	...
	100 Government Guano ...	3276	1460	2 11 1	1 13 2	0 17 11	...
	20 Sulphate of Potash ...	...	...	...	...	...	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
6	200 Superphosphate ...	...	...	...	...	...	...
	100 Government Guano ...	3304	1488	2 12 1	1 15 2	0 16 11	...
	20 Sulphate of Potash ...	...	...	...	...	...	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
7	200 Superphosphate ...	3004	1188	2 1 7	1 6 6	0 15 1	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
8	200 Basic Slag ...	2385	569	0 19 11	1 4 6	...	0 4 7
	100 Nitrate of Soda ...	...	...	...	...	...	...
9	20 Sulphate of Potash ...	2120	304	0 10 8	0 18 8	...	0 8 0
	100 Nitrate of Soda ...	...	...	...	...	...	...

This experiment was conducted on irrigable soil of a sandy nature. 80 lbs. of Appler oats were sown per acre on the 31st May, Nitrate of Soda was applied as a top dressing on the 28th August and the crop was reaped on the 6th December.

The results of this experiment are almost identical with No. 1, and the remarks made apply here also.

K. Meldal Johnsen, The Willows, District Humansdorp.

Plot.	Manurial Treatment.	Crop in lbs. per acre.	Increase in yield.	Value of in- crease @ 3/6 per 100 lbs.	Cost of Manure.	Profit.	Loss.
	lbs.		lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	No Manure ...	922	...	...	...	...	...
2	200 Superphosphate ...	2361	1442	2 10 5	0 10 6	1 19 11	...
3	200 Basic Slag ...	1912	990	1 14 7	0 8 6	1 6 1	...
4	100 Nitrate of Soda ...	780	...	...	0 16 0	...	0 16 0
5	200 Basic Slag ...	...	...	...	...	...	...
	100 Government Guano ...	2868	1916	3 8 1	1 13 2	1 14 11	...
	20 Sulphate of Potash ...	...	...	...	...	...	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
6	200 Superphosphate ...	...	...	...	...	...	...
	100 Government Guano ...	3572	2650	4 12 9	1 15 2	2 17 7	...
	20 Sulphate of Potash ...	...	...	...	...	...	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
7	200 Superphosphate ...	2416	1494	2 12 0	1 6 6	1 5 6	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
8	200 Basic Slag ...	2256	1334	2 6 8	1 4 6	1 2 2	...
	100 Nitrate of Soda ...	...	...	...	...	...	...
9	20 Sulphate of Potash ...	808	...	...	0 18 8	...	0 18 8
	100 Nitrate of Soda ...	...	...	...	...	...	...

This experiment was conducted on sandy soil which had been used for grain crops for several years. 80 lbs. Algerian oats per acre were sown and harrowed in with the fertilisers on the 18th May, Nitrate of Soda applied as top dressing on the 16th August and the crop reaped on the 23rd November, 1909.

The unmanured plot in this experiment yielded an exceptionally low return, due no doubt to continuous cropping in the past. The results of manuring are very clearly shewn, especially the beneficial effects of Superphosphate and Basic Slag. Where Nitrate of Soda was used alone or in conjunction with Sulphate of Potash the result in each case was actually below that of the unmanured plot. The best oat-hay was reaped from the plot dressed with Superphosphate alone. The straw from the plot which received the complete dressing was too long and coarse, and the ears very light.

Summary of Oat Experiments.

Plot.	Manurial Treatment.	Crop Return.	Increase in yield.	Value of increase @ 3/6 per 100 lbs.	Cost of Manure.	Profit.	Loss.
	lbs.	lbs.	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	No Manure ...	1523	...	...	...	...	...
2	200 Superphosphate ...	3057	1534	2 13 8	0 10 6	2 3 2	...
3	200 Basic Slag ...	2521	998	1 14 11	0 8 6	1 6 5	...
4	100 Nitrate of Soda ...	1597	74	0 2 7	0 16 0	...	0 13 5
5	200 Basic Slag ...	3257	1734	3 0 8	1 13 2	1 7 6	...
	100 Government Guano ...						
	20 Sulphate of Potash ...						
6	100 Nitrate of Soda ...	3515	1992	3 9 9	1 15 2	1 14 7	...
	200 Superphosphate ...						
	100 Government Guano ...						
	20 Sulphate of Potash ...	2940	1417	2 9 7	1 6 6	1 3 1	...
7	100 Nitrate of Soda ...						
	200 Superphosphate ...						
8	100 Nitrate of Soda ...	2591	1068	1 17 5	1 4 6	0 12 11	...
	200 Basic Slag ...						
	100 Nitrate of Soda ...						
9	20 Sulphate of Potash ...	1631	108	0 3 9	0 18 8	...	0 14 11
	100 Nitrate of Soda ...						

The above plots represent the average of the three manurial oat experiments carried out in the Humansdorp district during last season. Nitrate of Soda alone and applied as a top dressing on the Sulphate of Potash plot resulted in a loss. When Nitrate of Soda was applied as a top dressing on the phosphates the crop per acre was no more than where phosphates were used alone, and the profit considerably less. The complete manures gave a heavier crop per acre, but not so profitable.

These experiments seem to shew that the quantity of Nitrate of Soda applied is superfluous, and that Basic Slag should be applied immediately after rain some time—say two months—before sowing, to enable the plants to make full use of the manures the first year.

AGRICULTURAL ORGANISATION.

FORMATION OF BOARD OF AGRICULTURE.

After much discussion and years of negotiation the Board of Agriculture of the Cape Province has at last been formed. Its membership is made up as under:—

REPRESENTATIVES OF CENTRAL ASSOCIATION:

Mr. W. Hockly, Cullendale, Bedford.
Mr. R. F. Hurndall, Uitenhage.
Mr. John Arnold, Cathcart.
Mr. J. Adams, Warrenton.

REPRESENTATIVES OF AGRICULTURAL UNION:

Mr. C. G. Lee, Klipplaat.
Mr. P. W. Michau, Cradock.
Mr. J. Rawbone, Sir Lowry Pass.
Mr. J. Starke, Mulder's Vlei.

REPRESENTATIVES OF WESTERN PROVINCE HORTICULTURAL BOARD:

Mr. C. W. H. Kohler, Paarl.
Mr. D. de Vos Rabie, Worcester.

REPRESENTATIVES OF EASTERN PROVINCE HORTICULTURAL BOARD:

Mr. James Leighton, Kingwilliam's Town.
Mr. W. B. R. Goulden, East London.

THE CONSTITUTION.

The following is the Constitution of the Board as agreed upon at the final Conference held on the 21st of April last at Fort Beaufort:—

Whereas it is desirable to establish an organisation by which the Agricultural interest shall secure the attention which its importance demands,—to attain this object it is hereby agreed that a Board of Agriculture be formed.

1. That the Board of Agriculture of the Cape of Good Hope shall consist of members from the Executives for the time being of the existing Agricultural Organisations of the Colony, (viz., the Central Association, the Agricultural Union, Western Province Board of Agriculture and Eastern Province Board of Agriculture), as hereinafter provided who shall act as the medium between the several Agricultural Organisations and (a) the Provincial Government, and (b) the Inter-Colonial Agricultural Union, in respect of all matters decided upon by the various Congresses.

2. Representation of the several units on the Board of Agriculture shall be as follows:—The Executive of the Central Association shall appoint four members, the Executive of the Agricultural Union, four members, and the Executives of the Western Province and Eastern Province Boards of Horticulture each two members, and that Government have the right to send representatives from its technical staff to assist the Board of Agriculture in its deliberations. The said Board shall be appointed annually.

3. That the Board of Agriculture is hereby authorised to act as an Advisory Board to the Government and has full power to represent the several units, the Board's decisions being binding.

4. That each unit represented on the Board of Agriculture shall carry the number of votes to which it is entitled, as provided in Clause 2, irrespective of the number of its representatives actually present at any meeting of the said Board, provided that no member of the Board may represent more than one unit.

5. That the Board of Agriculture shall elect each year a Chairman and Vice-Chairman from among its own members, who shall have both a deliberative and a casting vote when presiding at meetings.

6. In the event of the Chairman or Vice-Chairman being absent from any meeting of the said Board, a Chairman shall be chosen from among the members present.

7. That a Secretary, Treasurer, and Auditors shall be appointed by the said Board.

8. The Board of Agriculture shall at its first meeting fix the number which constitutes a quorum; and shall draft Bye-Laws to regulate its procedure.

9. That the Board of Agriculture shall from time to time send reports of their meetings to the several units, and in any case must report at least annually, which annual report shall contain an audited financial statement.

10. That any funds at the disposal of the Board of Agriculture shall be vested in the hands of the Chairman and treasurer for the time being of the said Board, who are authorised to receive and disburse the funds of the Board; and that all units represented on the Board shall contribute to the funds in proportion to their representation on the Board, the amount of such contribution to be settled hereafter.

11. In the case of a vacancy on the Board caused by resignation or otherwise, the Executive who appointed that member shall appoint a successor to fill the vacancy.

12. In the event of any amendment to this Constitution being deemed advisable, printed copies of such amendment shall be forwarded to the several units for their consideration and acceptance or otherwise, three months before the annual meeting of such units; failing acceptance by all the units, it shall not be effective unless agreed to by at least two-thirds of the members of the Board of Agriculture at their first meeting thereafter.

13. That the Board of Agriculture shall co-operate with Organisations in other Provinces in South Africa having a similar object.

It was further resolved that an effort be made to have the proposed Board of Agriculture incorporated by Act of Parliament.

Resolved that the Under-Secretary for Agriculture be requested to act as an Executive Officer in this matter, receive correspondence, etc., and take steps to get the Board of Agriculture into working order at as early a date as possible.

AN EXPLANATORY MEMORANDUM.

The following letter and memorandum have been circulated on the above subject:—

Sir,—I am directed to inform you that at the second Conference for the Closer Union of Agricultural Organisations of this Colony, held at Fort Beaufort on the 21st instant, the amendments to the draft Constitution of a Board of Agriculture proposed by the several organisations concerned were considered and a Constitution finally adopted. Copies of the terms of this Constitution are being prepared by Mr. T. Hall, Secretary to the Farmers' Central Association and will be forwarded to you at an early date. The Board of Agriculture can, therefore now be constituted in the manner laid down in the Constitution, and as I have been asked to act in my official capacity as Executive Officer in order to bring the Board into being, I have the honour to request that you will be good enough to move your Executive to elect at an early date the members to represent your body as the Secretary for Agriculture is anxious to see the Board constituted before the 31st May next.

In making this request I have at the same time to express Mr. Malan's hope, with a view to investing the Board with a representative character and securing the confidence of the farming community as a whole, in the possession of which alone its work will command respect and influence with farmers, that your Board will elect as members farmers who can respectively speak with authority on one or more of the branches of Agriculture which your body represents, that is to say, that the Farmers' Central Association and the Agricultural Union will, in the choice of members on the Board of Agriculture, bear in view that sheep, angora goat, cattle, horse and ostrich farming, irrigation and cereal-growing are adequately represented and that the Boards of Horticulture similarly appoint as their members gentlemen who have intimate knowledge of the different sections of industry which such Board represents.

The Board of Agriculture when constituted will no doubt gradually see on what lines its work should develop and in which directions such work can best be extended; but in order to establish some basis for useful work and to indicate more or less the relation of that body to the Department, I am instructed to enclose a memorandum embodying suggestions as to spheres in which the Board of Agriculture might labour with advantage.

This memorandum points to the necessity for an active and capable secretary to the Board, who shall be well-paid and devote the whole of his time to the Board's work. To this end and in view of the fact that the Board, will, under the scheme outlined, actually do what may be termed extension work for the Department, the Government is prepared to subsidise the Board to the extent of paying the salary and travelling expenses of the Secretary and the railway fares of members of the Board, of delegates to the Congresses of the four organisations represented on the Board and of members of the Horticultural Boards to their quarterly meetings.

The Government will not in future pay subsidies direct to any organisation but will leave the Board of Agriculture to subsidise these organisations out of the amount that will be placed at the disposal of the Board.

Will you be good enough to let me have in due course the names of the members elected by your body in order that I may call the first meeting of the Board for preliminary work.

A similar letter and a copy of the Memorandum referred to are also being addressed to the other three organisations concerned.

I have, etc.,

(Sgd.) P. J. DU TOIT,
Under Secretary for Agriculture.

MEMORANDUM.

1. The Board of Agriculture could bring before associations of farmers information as to the work done by the Department.

2. The Board might disseminate among associations of farmers information received from the Department or otherwise, which it would be desirable for farmers to become aware of, and might distribute useful literature as far as lies in its power.

3. The Board should bring to the notice of the Department the needs and views of the farming community as expressed at organised meetings whenever such a course may be considered to be in the interests of the Colony or any section of it, and to advise the Department on conflicting resolutions. Matters affecting a particular district or section of a district should be dealt with by the local association in direct communication with the Board of Agriculture; but questions relating to interests not confined to a particular district should be submitted to the congress of which the local associations which bring forward the questions are respectively affiliated. All resolutions, whether emanating from the district association or from a congress should be submitted to the Board of Agriculture for its consideration and by that body transmitted with its views to the Department if the Board should deem such a course advisable.

4. The influence of the Board could be employed in organising stock fairs through associations of farmers where such sales might be likely to assist farmers to dispose of their surplus stock at reasonable prices.

5. The Board might advocate and organise public sales of agricultural produce in order to ensure as far as possible payment according to quality and, by these means, improvement of quality.

6. The Board might advocate uniformity and improvement of packing produce for the market; and, in connection therewith, branding of receptacles for the purpose of establishing a good name for and affording a means of identification of produce of careful farmers.

7. The Board might endeavour to secure combined purchase of seeds (after testing of samples by the Department) and of implements and other articles required by a number of farmers whose needs and proximity to one another render co-operation desirable.

8. The Board should organise trials of machinery, competitions in cultivation for crops and in the management and care of orchards, etc.

9. For the purpose indicated the Secretary to the Board should freely move about organising farmers and rendering assistance to associations of farmers wherever practicable.

10. A balance-sheet should be submitted by the Board to the Department as soon as possible after the 31st December in each year.

AGRICULTURAL ZOOLOGY FOR SOUTH AFRICAN STUDENTS.

BEING A COURSE OF LECTURES ON AGRICULTURAL ZOOLOGY, DELIVERED BY DR. J. D. F. GILCHRIST, PROFESSOR OF ZOOLOGY AT THE SOUTH AFRICAN COLLEGE, IN CONNECTION WITH THE TECHNICAL EVENING CLASSES INAUGURATED BY THE SCHOOL BOARD OF THE CAPE DIVISION.

(Continued from Page 577.)

Arachnida *(continued).*

Family III.—Ixodidæ or Ticks.

These are large acari or mites with a hard shield, which, in the male covers the entire body, in the female only a small part, the rest of the body being capable of great distension. They are all blood suckers, and the mouth parts consist of cutting chelicerae with hooked ends, a part, the hypostome or labium, behind these, with re-curved barbs, and on each side the jointed second pair of appendages. Owing to the re-curved barbs, the tick, once fairly fixed, cannot be pulled off without leaving behind the mouth parts, which may give rise to sores.

Life History of the Tick.

The eggs are laid by the female on the ground, and, after some time, longer or shorter, according to the species, they hatch and produce small larvæ; these begin to crawl up the stem of grasses and bushes, and remain there till they are enabled to attach themselves to a suitable host (oxen, buck, etc., and even man) which may chance to brush against them in passing. (Fig. 129.) They soon pierce the skin and suck the blood. It was supposed at one time that they might be able to feed, in the absence of a host, on vegetable tissue, but it appears that after a time, it may be weeks or months, they die if no such host is found, a fact of considerable practical importance, as any area may thus be cleared of ticks by keeping off all animals which may act as hosts. After feeding for some time, and, in some species, after two or three changes of host, the females are fertilized by the males. Up to this point the males and females are about the same size, but now the female begins to swell up enormously by a rapid absorption of blood. The males remain comparatively small, so that they are sometimes mistaken for young ticks, the females being thought to be the adults. The female then becomes detached, falls to the ground,

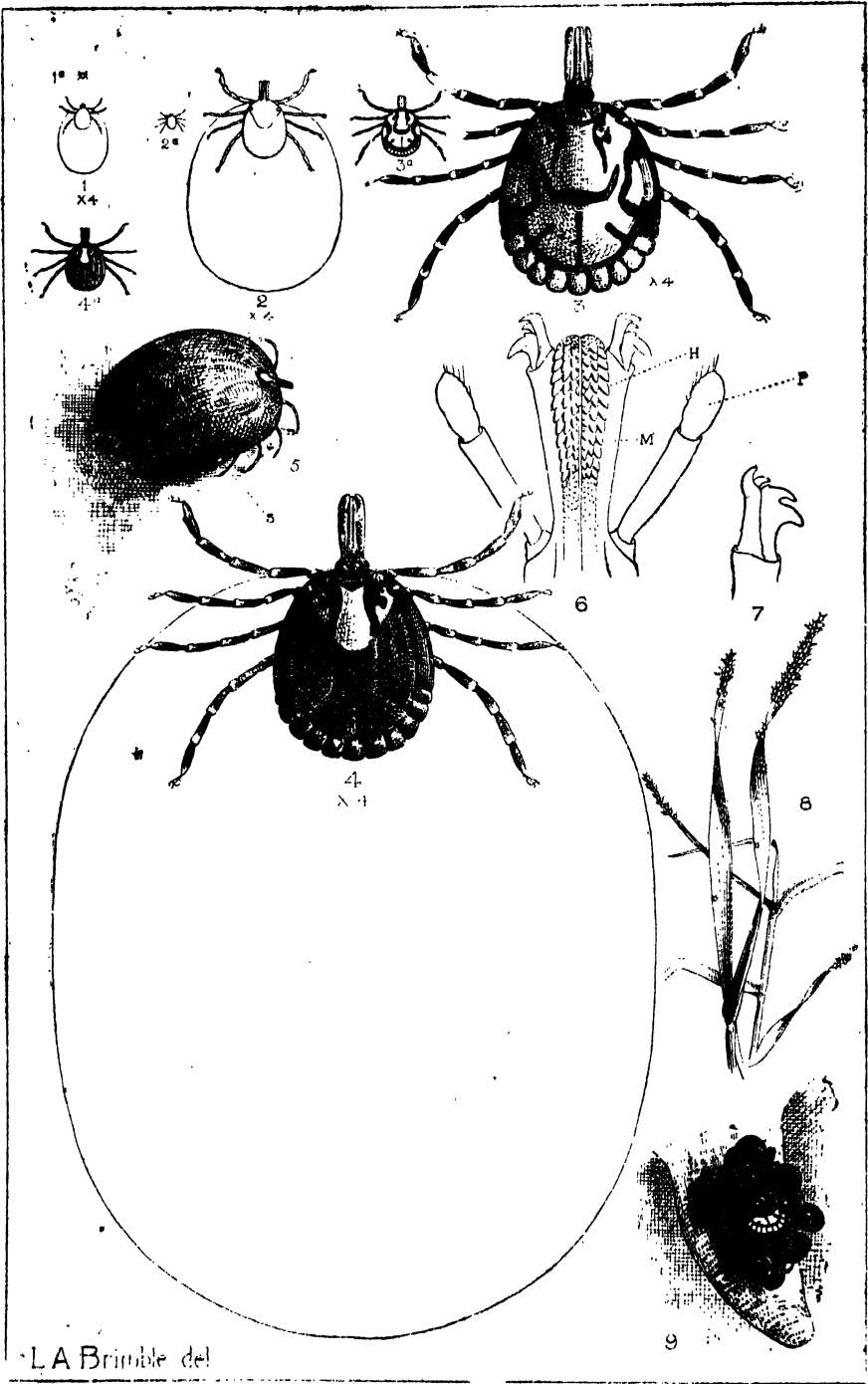


Fig. 129.—For details see opposite page.

and seeks a place where she may lie hidden, usually in grass or soft loose ground. After a period of quiescence, she begins to lay eggs, from which the larvæ may emerge to begin again the life-cycle.

AMBLYOMMA HEBRÆUM (Fig. 129), the Bont, Tortoise-shell, or Variegated Tick, derives its name from the bright and variegated colour of the male, which is more conspicuous and better known than the much larger female.

RHIPICEPHALUS DECOLORATUS, the Blue Tick, is perhaps the most common tick in South Africa. It is a comparatively small form, though the engorged female, which is of a bluish colour, may attain a length of a quarter to half an inch. It is of importance in South Africa, as it conveys the protozoan parasite (*vide* p. 26), *Piroplasma bigemum*, which causes the disease known as red-water in cattle. It also conveys, according to Theiler, a small protozoan parasite, *Anaplasma*, which causes a form of biliary fever.

HYALOMMA ÆGYPTIUM, the Bont-leg Tick, is one of the largest of South African Ticks, and specimens are recorded as much as three-quarters of an inch in length. It may be distinguished from the Bont-Tick, which is often about the same size, by the bont or variegated colour of the legs, which have white markings at their joints. The colouring of the body is also not so brilliant, being black with white marginal stripes in the male, and brown with irregular light blue stripes in the full-sized female. It is a tick of the drier parts of South Africa, chiefly the Karroo.

RHIPICEPHALUS EVERTSI, the Red Tick, is of a reddish colour, and has a rather elongate body. The eggs also are of a characteristic red colour. The tick is usually found in the hairless part of its host, which may be almost any domesticated animal. It conveys a form of biliary fever.

RHIPICEPHALUS APPENDICULATUS, the Brown Tick, is characteristic of the low-lying warmer parts of the North, as is also *R. SIMUS*, called by Lounsbury the Black-pitted Tick. These two ticks are associated with the spread of the African East Coast fever.

HÆMAPHYSALIS LEACHII, the Dog Tick, is common on dogs, and conveys a disease known as biliary fever.

IXODES PILOSUS, the Paralysis Tick, is supposed to cause paralysis in the animals on which it occurs. Whether it really does so and in what way is not known.

Family IV.—Argasidæ or Leathery Ticks.

These are distinguished from the last family, which includes what are commonly called "ticks," by the fact that they have no hard shield, and that their mouth parts are situated under the body. They may be mentioned, as they include the Fowl Tick, *ARGAS PERSICUS*, sometimes called in South Africa the Tampan or Wandluis (Lounsbury). They are brown or grey in colour, flat, and with a keel or ridge of a pale colour round the margin of the body. They are nocturnal in their habits, and attack fowls at night, crawling away into cracks and crevices to hide themselves on the approach of day. They sometimes cause the death of the fowl, but

Fig. 129.—The Bont Tick, *Amblyomma hebræum*. (Report of Cape Government Entomologist, 1901.) 1, larva, four times natural size; 1a, natural size; 2, nymph, four times natural size; 2a, natural size; 3, male adult, four times natural size; 3a, natural size; 4, adult female, four times natural size; 4a, natural size, with lines as in 1 and 2, to show the relative size to which it may swell; 5, fully engorged female, natural size; 5, spiracle or breathing aperture; 6, mouth parts of male adult from below; p, pedipalpus or palpus; h, hypostome; m, chelicera or mandible with hooks extended; 7, mandibular hook of female adult; 8, larvae on blades of grass; 9, adult male surrounded by females on teat of goat.

whether from loss of blood or by transmitting some disease is uncertain. The much dreaded tick-fever, to which man is subject in some parts of South Africa, is communicated by a member of this family, *ARNITHODORAS MOUBATA*.

Order IV.—Xiphosura or King Crabs.

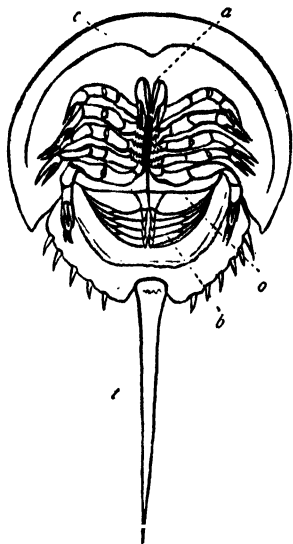


Fig. 130. -- The King Crab, *Limulus polyphemus*; *a*, chelicerae; *b*, gill-books; *c*, ventral edge of carapace; *o*, operculum. (Nicholson)

These are by some regarded as representing a primitive group of the Arachnids. From fossil remains they seem to be related to a type of animal (Eurypoterida) formerly abundant; they are now represented only by a few species, of which *LIMULUS POLYPHEMUS* (Fig. 130), the King Crab, is the best known. Like the scorpion, its body consists of three regions, a cephalothorax, which is large, rounded in front and with eyes on its dorsal surface, a second region which may correspond to the pre-abdomen of the scorpion, and a third consisting of a long spine. On the ventral surface there are chelicerae, and also pedipalpi not different from the four pairs of legs which follow, and are provided with claws except the last. The appendages on the pre-abdomen are, first, a plate or operculum with the genital aperture, as in the scorpion, but the succeeding appendages, five in number, appear to be totally unlike the lung-books of the scorpion; they are plate-like, and each has a number of leaf-like gills, called gill-books. There is reason, however, for believing that they correspond to the lung-

books of the scorpion, only that they are not sunk in cavities in the body.

Classification of Arachnida.

Order I.—Araneida, *e.g.*, Harpactira.

Order II.—Scorpionida, *e.g.*, Parabuthus.

Order III.—Acarina, *e.g.*, Psoroptes, Amblyomma.

Order IV.—Xiphosura, *e.g.*, *Limulus*.

MOLLUSCA OR SOFT-BODIED ANIMALS.

In the group of the Arthropoda the whole body is protected by a hard cuticle, movement being provided for by a jointed, segmented body and jointed limbs; in this group an entirely different method of protection appears, a part only of the body secreting a hard calcareous shell or shells into which the body can usually be withdrawn. In co-ordination with this, we find that *the body has little or no trace of segmentation*, and there are no jointed appendages, in the absence of which we find entirely different organs performing the functions of movement of the body and capture of food; thus the animal moves along by means of the muscular and soft under side of the body or *ventral foot*, and the mouth organs consist of a rasp-like tongue or *radula*. As in the Arthropoda, the chief

part of the nervous system is in the form of a ring round the oesophagus, *circum-oesophageal nerve ring*, and the true *body cavity* is much reduced. A larval form, which sometimes occurs in the development, is known as a trochosphere, which occurs also in the marine worms (p. 61), though this fact cannot be taken as an indication of any real affinity between the groups.

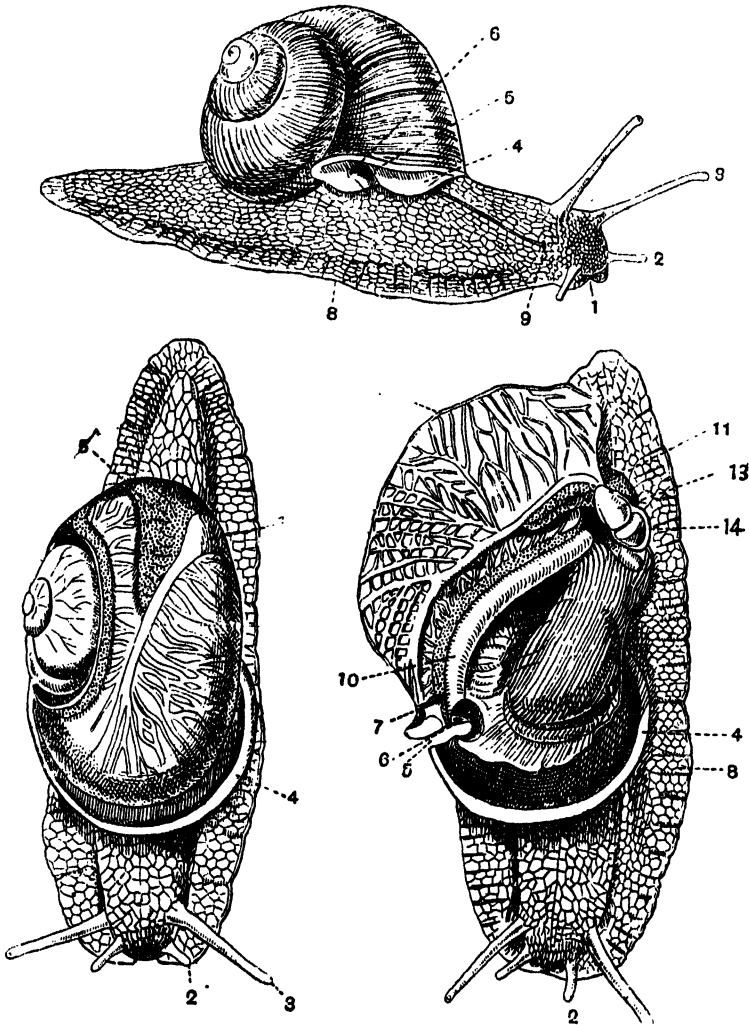


Fig. 131.—The Snail, *Helix pomatia*. The upper figure shows the animal with shell, the lower figures shows it without shell and with mantle cavity laid open: 1. mouth; 2, anterior tentacles; 3, posterior tentacles; 4, edge of mantle; 5, respiratory aperture; 6, anus; 7, opening of ureter; 8, foot; 9, reproductive aperture; 10, rectum; 11, kidney; 12, upper well of respiratory cavity; 13, auricle; 14, ventricle. (Hatschek and Cori).

The three chief classes of the Mollusca are: (1) GASTEROPODA, or Snails, Slugs, etc., which crawl on the ventral surface of the body or "foot"; (2) LAMELLIBRANCHIATA or Bivalves, such as Mussels, Oysters, etc., which are enclosed in two shells hinged together, and which have the

foot in the form of a muscular lobe; (3) CEPHALOPODA or Sea-cats, Cuttle-fish, etc., in which the foot has assumed the form of long tentacles or arms provided with suckers.

Class I.—Gasteropoda.

This is the most familiar class of the Mollusca, as it includes land forms, such as snails and slugs, and the commoner sea forms, such as periwinkles, the rarer saddle-backs, etc. As compared with other molluscs they show an adaptation generally for a crawling mode of life, and might be called crawling Molluscs. Thus they have a distinct muscular ventral part or *foot*. There is usually only *one shell* or, as in the saddle-backs, there may be *several*, but never two, as in the Bivalves. There is usually a distinct head with tentacles.

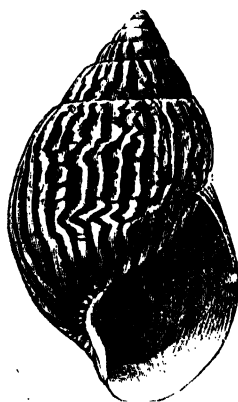


Fig. 132.—*Achatina zebra*, S. Africa. (From *Cambridge Natural History*).

HELIX (Fig. 131), the common garden snail, is a suitable type to illustrate the class. Numerous species of the Helicidæ are found in South Africa, of a small size and peculiar to the country; in fact this is the chief feature of its molluscan fauna. One very large form, ACHATINA (Fig. 132), peculiar to Africa, is abundant in some places in South Africa. Its shell may be over six inches in length, and the correspondingly large animal as it crawls along with this large superstructure is a very striking object. *Aerope*, the largest of helicoid carnivorous forms, is peculiar to South Africa.

As the native Helicidæ are so small, and *Achatina* has not been so fully investigated, it will be most convenient for study to take a common form which is abundant, though it has been introduced from overseas. This is HELIX ASPERSA, the common garden snail, closely allied to *H. pomatia*, which is regarded as edible in some countries. The alleged history of its introduction is as follows: A Frenchman who arrived at the Cape was particularly struck by the total absence of his favourite delicacy, and resolved to introduce this valuable gastronomic titbit, both for his own benefit and for that of his less enlightened fellow colonists. Accordingly at the first opportunity he brought out with him a large collection. With his pockets filled with them he used to sally forth at dusk and quietly drop them into his neighbours' gardens. The result was a great success, in that the snail increased rapidly in the congenial climate of the Cape. Unfortunately, one fatal mistake from another point of view was made. More familiar with the shell-less article as it appeared on the table than with the living animal, he had brought the wrong animal, *Helix aspersa*, in place of *H. pomatia*. The introduced species, however, though less highly esteemed in France as an article of diet, is still edible, and Colonials who care to do so can avail themselves of the now abundant supply, besides ridding their gardens of a rather troublesome pest. The two species are equally good, however, for the purpose of study.

External characters.—There is a spirally coiled shell into which the animal can completely withdraw itself for shelter. When expanded, it will be seen that it crawls on a flat muscular foot, and its progress is made easier by the continued secretion of a slimy substance from a gland in front, just behind the mouth. Two pairs of tentacles occur in the head region, an anterior and smaller pair, by means of which the animal feels

its way along, and a posterior and larger pair which are provided with eyes at their tips. Protruding from under the edge of the mouth of the shell may be seen the edge of the mantle, which is merely a fold of the skin by which the shell is secreted. It lines a large part of the interior of the shell, and the cavity so formed opens to the exterior by a pore, the respiratory pore, through which air is admitted to the mantle cavity or breathing chamber. Immediately below and to the right of the respiratory opening is the anus, and, on the right side of the head, below the large tentacle, there is the genital aperture. From this a groove runs backward along the surface of the body, a similar groove being found on the left side. The other external apertures are, the mouth, with two lateral and one inferior lip, and the aperture of the pedal slime gland immediately below the inferior lip. To find these it will be necessary to examine a dead specimen. The snail may be killed in an expanded condition by drowning, and afterwards put for a time in alcohol to preserve and harden it for examination.

After removing the shell by carefully chipping it away or twisting the animal out of it, it will be found on examination to be coiled round a hollow axis or columella, formed by the inner wall of the several turns. The shell substance itself consists of an outer or horny uncalcified layer (periostracum), a middle, thick and densely calcified layer, and an inner or nacreous layer, which is thin glistening and of a pearly lustre. In the animal thus deprived of its shell the various parts indicated in figure 131 may be seen without dissection.

The mantle cavity is merely a fold of skin, but in the snail its opening is so small that it would appear as if the cavity were in the body, though this is not so. The organs in the cavity may still therefore be included under external character. To see them the snail should be pinned down in a dish of water, and the mantle cavity opened by an incision, as shown in figure 131. There will then be seen, near the respiratory opening, the anal opening and opening of the kidney (nephridium). It will be noted that the numerous blood vessels on the roof of the cavity lead to the heart, which may be seen shining through the thin skin at this point; alongside of it may also be seen the kidney or nephridium.

Alimentary system.—The mouth is entirely different from that of insects. Instead of two jaws there is, in its roof, a hard horny bar, and, on its floor, a cartilaginous mass, on which is a long, rasp-like tongue called the radula. This tongue is a ribbon-like structure studded with fine teeth, and, as these get worn out, new teeth are formed in the pocket or sac, from which the radula springs. Behind the mouth cavity there is a gullet leading into a crop in which food may be stored. On each side of it may be seen two whitish salivary glands, whose ducts open into the mouth. Behind the crop is the true stomach, in which digestion takes place; from the stomach two tubes go off and divide and sub-divide into the large brown mass, which occupied the apex of the shell, and which is called the liver, though its function here, as in arthropods, may be more intimately connected with digestion than that of the liver in vertebrates. Following the stomach is the long intestine, which is coiled in the substance of the liver, and then runs forward, along the right side of the mantle cavity, as the rectum, to open near the respiratory opening. (Fig. 133.)

Vascular system.—The vessels on the roof of the mantle cavity converge and enter into a thin walled sac, the auricle, from which the blood is passed to a more muscular part, the ventricle. The ventricle drives the blood on to the body by two arteries, one to the visceral and one to the head region, where there are no true arteries nor veins, but merely blood spaces. The heart, consisting of auricle and ventricle, lies in a cavity provided with a definite wall, in communication with the kidney and giving

rise in the embryo to the rudiments of the reproductive cells. This pericardium therefore represents all that there is of a true body cavity. It may be contrasted with the pericardium of the crawfish and arthropods generally, which is merely a blood space and not a true body cavity.

Respiratory system.—This consists of the mantle cavity, into which air can be drawn and expelled after purifying the blood in the numerous veins on its roof. In aquatic molluscs there is a complex fold of the skin

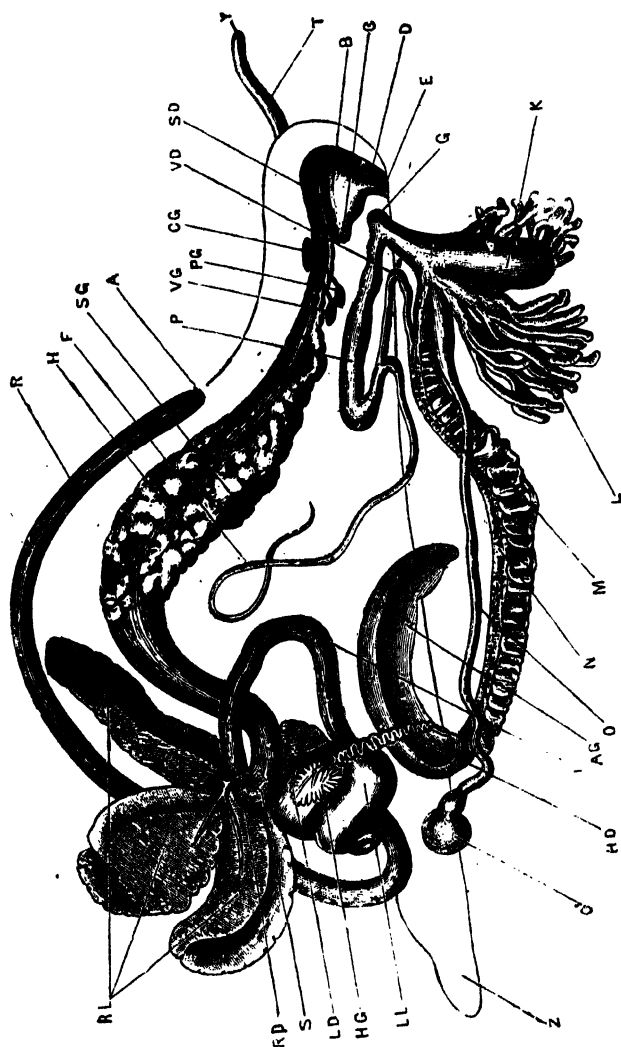


Fig. 133.—*Helix pomatia*, dissected from the right side. A, anus; A G, albumen gland; B, buccal mass; C, sac of radula; C G, cerebral ganglion; D, jaw; E, mouth; F, flagellum; G, genital aperture; H, crop; H D, hermaphrodite duct; H G, hermaphrodite gland; I, intestine; K, dart sac; L, mucous gland; L D, left bile duct; L L, left lobes of liver; M, female portion of common duct; N, male portion of common duct; O, receptaculum seminis; O', dilated end of receptaculum seminis; P, penis retracted; P G, pedal gland; R, rectum; R D, right bile duct; B L, right lobe of liver; S, stomach; S D, salivary duct; S G, salivary gland; T, tentacle; V D, vas deferens; V G, visceropneumal ganglion; Y, eye; Z, posterior end of zost. (From *Practical Zoology*, Marshall and Hurst).

in the mantle cavity called a gill or ctenidium, and, alongside of it, a specialised smelling organ called the osphradium.

Excretory system.—The kidney is a triangular organ, of a pale yellow colour, and situated close to the pericardium, into which it opens by a small ciliated passage. It is simply a sac with glandular walls thrown into lamellar folds. It opens to the exterior by a duct, the ureter, situated alongside of the rectum and ending near the respiratory aperture.

Nervous system.—This resembles the nervous system of the annelida, in that there is a supra-oesophageal pair of ganglia connected by commissures round the oesophagus to a sub-oesophageal pair, but there is no ventral chain of ganglia. On closer examination of the sub-oesophageal ganglia, it is found that the anterior artery goes through the centre of the mass, and that it gives off two commissures, on each side, to the supra-oesophageal; in fact it consists of four ganglia fused together, viz., a pedal pair and a visceral pair, which in some other Molluscs are quite separate from each other. The pedal ganglia supply the foot with nerves, and, in typical cases, the visceral ganglia give off nerves, which meet each other behind in the visceral region, forming the "visceral loop." Besides a pair of eyes there is another pair of sensory organs, consisting of two minute sacs provided with ciliated cells and containing a fluid, in which floats a particle of carbonate of lime. These organs, like the eyes, are connected by nerves to the cerebral ganglia, and are called otocysts or ears, but have probably to do more with the equilibrium of the body than hearing.

Reproduction system.—This is very complex (figure 133), as the snail is hermaphrodite, that is, has the sexes united in one individual, though it does not fertilize its own ova. The ovary and testis are combined in one organ, the ovotestis or hermaphrodite gland, a small yellowish body on the inner side of the second turn of the spire, and embedded in the liver. From this is a sinuous hermaphrodite duct, through which both ova and spermatozoa pass from the ovotestis. At the end of this duct there is a large albumen gland, from which a supply of nutritious matter is received. The duct then is continued into a wide common duct, which is partly divided into two, for the separate passage of ova and spermatozoa. These combined ducts then become divided into two separate ducts; one, consisting of a long vas deferens, is for the passage of the spermatozoa, and on it there is a long flagellum, in which the spermatozoa are made up into little packets called spermaphores. The vas deferens ends in a muscular sac, called the penis, which can be everted or turned inside out, so that the spermaphores can be conveyed to another snail. The other branch is the oviduct for the passage of the ova. On it is a long tube, ending in a round vesicle, called the spermatheca, and is for the storing up of the spermatozoa received from another snail. In *Helix aspersa*, a long diverticulum is given off from the spermatheca, and there is sometimes a small one in *H. pomatia*. The extremity of the female branch ends in a muscular vagina, to which is attached mucous glands and a sac called the dart sac, as it contains a calcareous rod which is thrust out into the body of another individual at the time of fertilization.

It will have been noted that there is a peculiar twist in the body of the snail, as all the openings lie on the right side. This is in all probability connected with the possession of a heavy shell, which naturally falls to one side, and this is confirmed by the fact that the Gasteropods, which have several shells, like the "saddle-backs" or chitons, do not exhibit such a twisting.

The Gasteropods are classified, on the basis of the degree of this twisting of the body as follows:—

Sub-class I.—Isopleura or Equal-sided Molluscs.

In these the body is protectel by eight saddle-like shells, and is not twisted. Numerous gills occur on each side. These forms are very abundant on the South African shores, and are usually called chitons or saddle-backs. They are difficult to detach from the rocks, and when they

are removed they roll themselves up like armadillos. Many of them have sharp prickly spines. A very large form, *Chiton gigantea*, is common in South Africa.

Near this group, but usually placed in a separate sub-class, are a number of degenerate worm-like Mollusca, the Solenogastres or Aplacophora, which are also symmetrical, but have no distinct foot nor shell.

Sub-class II.—Anisopleura, or Unequal-sided Molluscs.

The body is here twisted so that the anus, the kidneys, and the gills are shifted forward. These organs are supplied with nerves in the form of a loop from the visceral ganglia, and the nerves are of necessity dragged along in the transposition of the organs. The transposition may be so complete that the visceral loop is pulled into the form of the figure 8. Forms in which this occurs (Streptoneura) are the ordinary Limpet (*Patella*), the Perlemoen or Klipkoes of South African Seas (*Haliotis*), and the common periwinkle (*Oxystele*). The twisting may not, however, involve the visceral loop, which then remains straight; such forms (*Euthyneura*) are represented by sea-snails (*Opisthobranchiata*) such as *Aplysia*, the Sea-hare, and land air-breathing snails (*Pulmonata*) such as *Helix*.

Class II.—Lamellibranchiata or Bivalves.

This class is sharply marked off from the last by the fact that there are *two shells*, one on each side of the body, and joined together above by a horny flexible hinge. The mantle, which, as in *Helix*, makes the shell, is of course a replica of the shell, and hangs down as two large folds, one on each side of the body. The foot is in the centre; it is usually wedge-shaped, and not adapted for crawling; the gill plates are fused together to form large *lamellæ*, hanging down on each side of the foot. There is nothing in this to twist the body, which is therefore bilaterally symmetrical. The gills are ciliated, and serve, not only the purpose of respiration, by creating a current of water between the shells, but also act as food providers; the food is in this way brought to the animal, which is therefore mostly stationary. This is reflected in the degenerate condition of the mouth and head, there being *no distinct head nor odontophore with a radula*.

There is in South Africa a large selection of Bivalves, which may serve as a type of this class. A form, which is commonly taken for this purpose, in other countries, is *Anodonta*, a fresh water mussel, which does not appear to occur in South Africa, though *UNIO CAFFER* is found in fresh water on the Cape Flats, and another form in fresh water in the Transvaal. A form hardly distinguishable from the common Northern black-mussel (*Mytilus edulis* var. *meridionalis*) is abundant. The white mussel, *DONAX SERRA*, which occurs in abundance on many sandy beaches a few inches below the surface, will probably be found the most convenient and readily procurable, and is on sale as an article of food. *ANODONTA* may, however, be taken as a type to illustrate this group, as it has been so fully described.

External characters.—The shell has a dark outer or horny layer, a thick calcareous middle layer, and a thin nacreous inner layer. Curved lines of growth may be seen on the shell marking the seasons of more active growth. The smallest of these is nearest the hinge, and marks the earliest stages of growth at a point known as the umbo. When the animal is alive and undisturbed, the foot may be seen more or less

protruded, and, at the posterior end, two fleshy apertures, which are merely modifications of the mantle, and are known as the exhalent or dorsal and inhalent or ventral siphon. If the animal be removed from the shell by cutting the strong muscular attachment, various marks will be seen in its inner surface, caused by the attachment of muscles. The two largest are those of the anterior and posterior adductor muscles, which pass from one shell to the other and are capable of closing it very firmly. The foot also has special muscles attached to the shell, in which they leave distinct marks, though smaller; they are called retractor and protractor muscles. In many shells, and in practically all those of the white mussel, little pearl-like concretions are seen, and on microscopic examination in the case of the last minute trematodes may easily be detected. It is now known that these small flat-worms are the origin of pearls, not grains of sand, etc., as was formerly supposed.

If the body be now examined the relationship of the foot and siphons may be made out; the mantle or inner lining of the shell and the lamellate gills internal to this may also be seen.

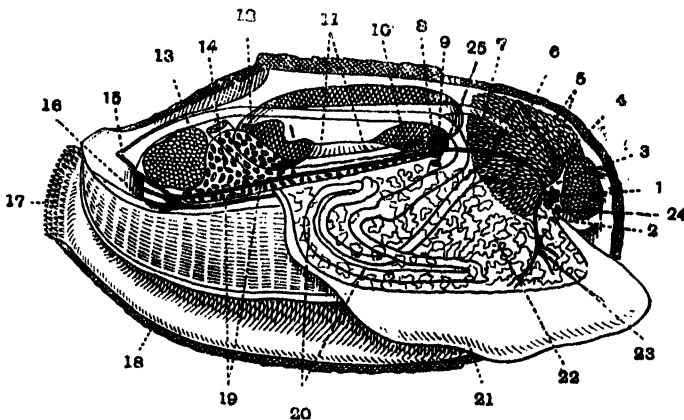


Fig. 134.—Right side of *Anodonta mutabilis* dissected to show the viscera. (Shipley and Macbride's *Zoology* from Hatschek and Cori). 1, cerebro-pleural ganglion; 2, cerebro-pleural commissure; 3, oesophagus; 4, anterior retractor muscle; 5, liver; 6, stomach; 7, aorta; 8, external opening of kidney; 9, internal opening of the same; 10, pericardium; 11, right auricle; 12, posterior end of ventricle passing into posterior aorta; 13, rectum; 14, glandular part of nephridium; 15, anus; 16, opening of epibranchial chamber; 17, ventral siphon; 18, edge of shell; 19, cerebro-visceral commissure; 20, intestine; 21, foot; 22, reproductive organs; 23, pedal ganglion of right side; 24, mouth; 25, opening of reproductive organs.

Alimentary system (Fig. 134).—The mouth is just behind the anterior adductor. There is no head, and the only distinct organ here are small flaps of skin or labial palps, two on each side. There is a short gullet, leading into a wide stomach, which is provided with a liver like that of the snail. The intestine twists about in the foot and then passes dorsally through the heart. The intestine has a folded wall or typhlosome on its ventral wall comparable to the dorsal typhlosome of the worm. In it also there may be seen a clear glassy rod, called the crystalline style, which is supposed to be a reserve food supply. The intestine ends in the rectum, which opens by the anus above the posterior adductor.

Circulatory system.—The heart consisting of a muscular ventricle and two thin and transparent auricles, one on each side. The intestine passes through the ventricle. A thin walled sac, the pericardium, surrounds the heart.

Excretory system.—Two kidneys, nephridia or organs of Bojanus, lie below the heart, each consisting of a tube bent on itself. The lower limb is the real kidney, and has much folded walls. It opens into the pericardium. The upper limb is a simple tube, and conducts the excreted matter to the exterior opening by a pore situated anteriorly between the gill and the foot.

Nervous system.—The cerebral and the pleural ganglia are fused together (in *Helix* it is the pleural and pedal). The pedal ganglia are situated in the foot close together, at some distance from these, and a third pair of ganglia, the visceral, is placed beneath the posterior adductor. There are otocysts in the foot, and a patch of sensory epithelium or osphradium at the base of the gills.

Reproductive system.—Ovaries and testes occur in different individuals, and lie in the upper part of the foot through its substance. They open near the openings of the nephridia.

Development.—When the eggs are expelled they are caught in the outer gill plate and are fertilized by spermatozoa which happen to come in from another mussel with the current of water passing in by the inhalent siphon and out by the exhalent siphon. The eggs develop into peculiar larvæ, called Glochidia, provided with a pair of delicate triangular shells, but no foot. When they leave the shelter of the gills of the mother, and are swept out into the water, they lay hold of the fins of a passing fish, and live on it as parasites for some time, subsequently quitting their host and taking up the mode of life of the adult.

The class Lamellibranchiata may be divided into,

Sub-class I.—Protobranchiata.

These include forms like *NUCULA*, with a simple gill like that of the Gasteropoda.

Sub-class II.—Filibranchiata.

Forms like *MYTILUS*, in which the gills are in the form of loosely united filaments.

Sub-class III.—Eulamellibranchiata.

Forms like *ANODONTA*, in which the gill filaments are united together into plates, their ends being bent up and united to the mantle

Before leaving the Lamellibranchiata a small group of Molluscs may be mentioned, constituting a class which, in some ways, connect this with the previous class of the Gasteropoda. It is represented by the "Elephant's-tooth-shell," *Dentalium*. The shell is a single hollow tusk-like structure open at both ends, and as it is cylindrical, so, of course, is the mantle. The foot is long and has three lobes. There is a radula and two nephridia.

Class III.—Cephalopoda or Cuttle-fish.

The class includes the Octopus or Sea-cat, *Sepia*, or Chocca, etc. Though they look so very different from snails and mussels, yet their bodies are on the same plan. Thus the shell when present is in the commoner forms covered by the skin, and no longer serves as a protection, as this is not so much needed and interferes with rapid movement. The foot is also much modified; the front part of it surrounds the head, and is modified into long arms, provided with suckers, by which the animal is able

to defend itself and act on the aggressive. The hinder part is modified into a tube. The mouth parts also are more formidable weapons, as in addition to the radula there are two powerful beak-like jaws. The nervous system is much concentrated, the chief ganglia being fused together so as to form a sort of brain, which is protracted by a hard though not bony skull. The mantle is well developed, and forms a large sac, in which lies a pair of gills and the openings of the internal organs, including the well-known "ink sac," from which the animal can squirt out a cloud of ink to cover its retreat. The head is distinct, and has large eyes.

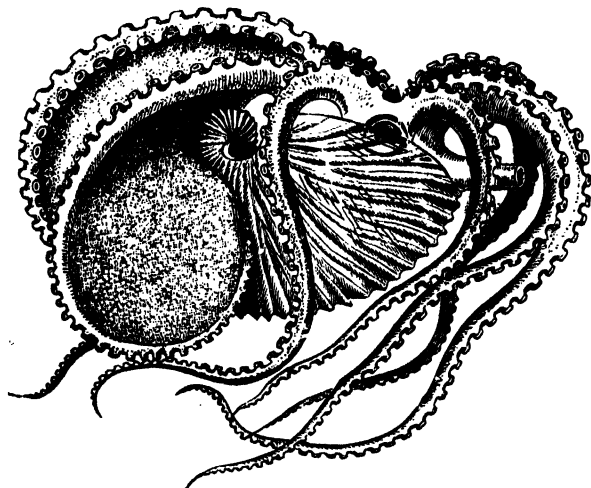


Fig. 135.—The Paper Nautilus, *Argonauta argo* (female). swimming. (*Zoology*, Sedgwick).

One section of the group does not quite fall under this definition, as it has an external shell and two pairs of kidneys and auricles, which would seem to indicate a segmentation of the body. This section (Tetrabranchiata) is represented by the Pearly Nautilus.

The class is divided into two sub-classes on this basis as follows: Sub-class I., Tetrabranchiata or four-gilled forms, including the Pearly Nautilus, and Sub-class II., Dibranchiata or two-gilled forms, including those with ten arms (Decapoda) such as Sepia, the Squid or Chocca, and those with eight arms (Octopoda), including the Octopus and Argonauta, the Paper Nautilus (Fig. 135). This last-mentioned form is of peculiar interest to South Africans, who are familiar with its delicate white shell. This shell does not really correspond to the shell of the ordinary Mollusc, but is a special structure, made, not by the mantle, but by a specially modified pair of arms. The female alone makes this shell, which is merely a sort of nest in which the eggs are hatched.

Classification of the Mollusca.

Class I.—Gasteropoda.

Sub-class I.—Isopleura, *e.g.*, Chiton.

Sub-class II.—Anisopleura, *e.g.*, Patella, Helix.

Class II.—Lamellibranchiata.

Sub-class I.—Protobranchiata, *e.g.*, Nucula.

Sub-class II.—Filibranchiata, *e.g.*, Mytilus.

Sub-class III.—Eulamellibranchiata, *e.g.*, Anodonta.

Class III.—Cephalopoda.

Sub-class I.—Tetrabranchiata, *e.g.*, Nautilus.Sub-class II.—Dibranchiata, *e.g.*, Octopus, Sepia.**ECHINODERMATA OR ANIMALS WITH SPINY SKINS.**

At first sight the animals included in this group—Starfish, Sea-Urchins, etc.—seem to have more affinities with the radially arranged Coelenterata than with the higher groups. Thus, in the adults, there is a *more or less distinct radial symmetry*, in which five regions, arranged round a common centre, may usually be made out. On the other hand, we find, on closer examination, that in most there are distinct *traces of bilateral symmetry*, and that in the young this is very marked. Again, the spines and plates which surround the animal seem superficially to be comparable to the chitinous cuticle of an arthropod, or the calcareous shell of a mollusc, which are secreted by the skin, and therefore ectodermal in origin, but the *spines and plates* are, in reality, under the surface of the skin, and are of *mesodermal origin*. Finally, as conclusively separating them from the radial Coelenterates, there is here a *well-developed body cavity*, in some respects more highly developed than elsewhere, as a part of the body cavity becomes specialised into a *water-vascular system* for the purpose of locomotion and respiration. Probably this general disposition of organs is associated with the resumption of a more sedentary mode of life. Certain organs, however, are of a primitive character; thus the nervous system is not specialised, nor are secretory organs.

The Echinodermata may be divided into the following classes:—

- I. Asteroidea or Starfishes.
- II. Ophiuroidea or Brittle-stars.
- III. Crinoidea or Sea-lilies.
- IV. Echinoidea, Sea-urchins, or Sea-eggs.
- V. Holothuroidea or Sea Cucumbers.

Class I.—Asteroidea,

The Starfishes are characterised generally by the possession of five arms or rays, each having a groove on its under surface, from which protrude a great number of sucker-like organs or tube-feet. Starfish are abundant in South Africa, and many forms may be got in rock pools, as, for instance, *ASTERIAS CAPENSIS* and *ASTERIAS GLACIALIS*.

ASTERIAS RUBENS does not occur in South Africa, but may be taken as a convenient type to illustrate the general features of the group. (Fig. 136).

External features.—The body is covered with a fine ciliated skin. On the upper surface may be seen delicate tufts of skin, which are breathing organs, and numerous hard spines, amongst which are special small ones (*pedicellariæ*) provided with pincer-like ends.

In the middle of the upper disc or central part is situated the anus, and, a little to one side of it, the madreporic plate, which is the external opening of the water vascular system, and which being thus situated *eccentrically* disturbs the radial symmetry of the body.

On the under side of the body is the mouth, situated in the centre, and from it radiates a groove (ambulacral groove) along the under side of each of the arms. The grooves are roofed over by calcareous plates or ambulacral ossicles, between which protrude the numerous tube feet. On the terminal ossicle of each arm there is a tentacle with a red eye spot, which may be sensitive to light; the tube-feet here also are somewhat modified, and appear to be olfactory organs.

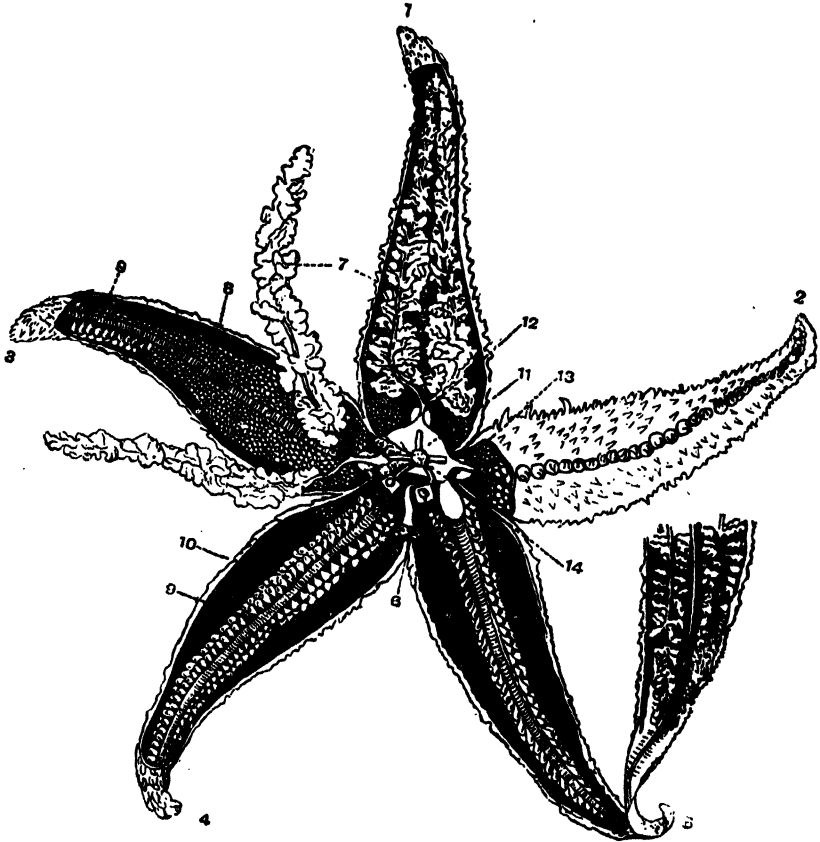


Fig. 136.—The common Star-fish, *Asterias rubens*, dissected to show motor digestive and reproductive systems. (Shipley and Macbride's *Zoology*, after Rolleston and Jackson).

Alimentary tract.—The mouth is in the centre of the lower surface, and leads by a short œsophagus into a large stomach with large, thin-walled sacculations or folds; these can be protruded, and envelope prey, which may be too large to take into the mouth. After the stomach proper there is a pentagonal pyloric portion with short ducts, which are continued as a pair of large hepatic cæca into each arm. The rest of the digestive tract consists of a short rectum, on which occur two small cæca.

The digestive tract lies in a large space, which is a true coelom; a special part of this is the characteristic water-vascular system, consisting of a ring round the mouth, giving off a vessel to each of the arms, and one to the madreporic plate; it also gives off nine glandular bodies, known as Tiedmann's bodies, the canal to the madreporic plate occurring in the position of a tenth.

(To be continued.)

CNICUS LANCEOLATUS, Hoffm., OR SPEAR THISTLE.

BY N. F. PILLANS, ECONOMIC PLANT INVESTIGATOR.

A biennial plant, generally of robust growth, 2 to 4 feet high or more. Stems erect, often branching near the top, green, surface slightly grooved, with a few ridges of sharp spines and the whole beset with fine hairs. Leaves for the most part densely clustered at base of stems, 6 to 14 inches long, 2 to 3 and half inches broad, green mottled white along midrib, crimped, deeply indented, tapered at base, beset with short spines and hairs all over upper surface, under side downy without spines often whitish, all segments terminated by long sharp spines: upper leaves one half to a third as long as lower. Flowers purplish, at ends of stems in dense round heads of long and sharp spines above which only the tips of the flowers protrude. (If these heads are pulled to pieces the small size and abundance of the flowers will be realised). Seeds smooth, ovate, compressed, light-brown, set on a disk in the head of flowers from whence they are lifted and borne away, when ripe, by the hairy plumes attached to their upper ends.

This plant, a native of Europe, parts of Asia and North Africa, is a true thistle of the Order Compositeae. It has now firmly established itself in some of the eastern districts of Cape Colony. Alluvial soils in valleys and along rivers are its favourite haunts. In those situations, where succulent grasses are so often found among the thorn trees, it forms dense masses of prickly and worthless growth which smother grasses and other fodder plants.

The methods of eradication suggested are hoeing with an implement such as used by natives, while the plant is in its first year, and burning off those patches of the plant already in flower or seed. To accomplish the latter object a good supply of fuel is necessary so that the stems of the thistle may be killed down to the ground. Any subsequent growth from the remaining stumps can be satisfactorily dealt with by the use of a spade or bush-pick.

A deal of perplexity exists in certain parts through this thistle having been confused with another. The Spear Thistle, with which we have been dealing, bears a striking resemblance to the plant known, in those countries where it flourishes, as the Scotch Thistle. This latter is the *Onopordon acanthium* of botanists and is the recognised floral emblem of Scotland. But we, in this Colony, are not yet concerned with the Scotch Thistle, for it does not occur here as a noxious weed. In fact its occurrence here at all is doubtful and therefore it is unreasonable to continue to apply the name of a plant we do not possess to one which has no right to that name.



THE SPEAR THISTLE--(*Cirsium lanceolatus*, Hoffm.)

Reduced about half natural size. [A section of the flower is shown in the lower part of the illustration.]

CO-OPERATIVE EXPERIMENTS—GRASSES.

In August, 1906, and again in September, 1907, reports were published in the *Agricultural Journal* from all over the Colony, giving the personal experience of farmers in growing foreign grasses from seed furnished by the Agricultural Department. From the information gained from these reports, it has been possible to continue the distribution, paying great attention to those which previously have given promising results, and discarding such as appear useless.

The general tone of the 1907-08 reports, as well as those of 1909, is very promising, and points to the fact that much may yet be done in the Colony in the way of artificial pastures and hay meadows, especially with a view to furnishing feed for live-stock at a season when veld is scarce, thereby increasing considerably the stock-carrying capacities of the farms, which at present in many instances, owing to droughts, deterioration of veld are very limited. Grass cultivation is gaining ground slowly, but very slowly when its advantages are taken into consideration.

ITALIAN RYE GRASS (*LOLIUM ITALICUM*).

This grass has done hardly so well this year as last, and in one instance rust is mentioned as killing it. On the other hand, cases are known where it has done marvellously well. Dr. Viljoen, M.L.A., in Caledon district, reaped a crop of about 20 acres at the rate of 7,500 lbs. per acre of excellent hay, a phenomenal yield altogether.

Rust is in one instance reported. Should this become general the grass will have to be abandoned, but as yet this is far from being the case. For fine quality of hay, for excellent grazing there is no grass that can surpass Italian rye grass. Normally it is an annual, a fact not to be forgotten, though where seasons are mild it may behave as a perennial.

It may be sown during the wet season on rich or on manured land, broadcast, and only lightly covered, using about 90 lbs. per morgen.

East London.—Mr. J. W. Venables. Sown March, 1907. Result: Good. Sown broadcast on unirrigated loam. Stock are exceedingly fond of it and notwithstanding the dry state of the weather (half inch of rain from June to November 15th), it has seeded twice. Cattle were allowed to feed it down when in seed.

Mr. G. J. Forrester. Sown May, 1907. Result: Failure. Sown on light sandy unirrigated soil. Seed did not germinate.

King William's Town.—Messrs. Haynes Bros. Sown: No date given. Result: Good. This grass has done well all through the dry winter. Kept on growing. Stock very fond of it. Anxious to get a lot of it growing as soon as possible as I feel convinced that there is no comparison between it and our natural grasses for pasture for stock.

Tembuland.—Messrs. C. H. and J. A. Watkind. Sown October, 1906. Result: Indifferent. Sown late on well manured black soil. Not considered of any value.

Mr. C. J. Olivier. Sown December, 1906. Result: Indifferent. Sown on irrigated heavy black soil. Attacked by rust about the end of February and died off during March. If sown earlier better results may be expected. I consider that part of the district (Noach's Ark) too wet for this grass and should do better in other parts.

Grigualand East.—Mr. R. T. Hart. Sown March, 1907. Result : Good. Doing very well. Suitable and will pay.

Dr. G. R. Watson. Sown December, 1906. Result : Indifferent. Nothing valuable resulted from sowing this seed but unfavourable season would account for this.

Mr. C. H. Bradley. Sown October, 1906. Result : Good. Quick and good for the season.

Wodehouse.—Mr. E. Birch, Dordrecht. Result : Good. Withstood frosts and is looking well.

Molteno.—Mr. Cuthbert Pope. Result : Indifferent. Sown on unirrigated ground. Suffered from weeds, severe hail and locusts.

Wodehouse.—Mr. F. H. K. Thither. Result : Bad. Very few blades shewing. Altitude too high and frost too severe.

Tarkastad.—Mr. F. E. Leppan. Result : Indifferent. Sown thickly broadcast on unirrigated sandy soil. Seed germinated splendidly, the grass grew covering over patch soon but died off suddenly. Possible it was sown too thickly. Judging by the way the seed germinated and the appearance of the seedlings I think it equal to other rye grasses.

Prieska.—Mr. I. J. Vos. Sown January, 1907. Result : Good. Excellent winter grass, withstands frosts. Does not make such good hay as *paspalum*.

Vryburg.—Mr. W. H. Edmunds. Sown December, 1906. Result : Indifferent. Sown thickly on unirrigated red loam. Starts well but cannot stand the heat on unirrigated lands. Locusts quickly destroy it although they have lucerne.

Ladismith, C.C.—Mr. J. A. Brwen, G. son. Sown April, 1906. Result : Failure. Sown broadcast on unirrigated vlei. Seeds failed to germinate.

1909 EXPERIMENTS.

Bredasdorp.—Ohlsson's Potteberg Farms. Sown May 11th, 1909. Result : Good. I think this grass will pay well and is well suited to tris district. I intend sowing a large quantity next season. All stock rejoice in it. I reaped it twice, viz., in September and November, 1909. I sowed it in five different localities, the soil in each being quite different, and it did well in every case. Sutton's Giant Evergreen Italian Rye grass also does well, but I would like to try it again under more favourable circumstances.

Humansdorp.—Mr. G. R. Christie. Sown 18th August, 1909. Result : Good. I intend sowing larger quantities this season. It looks well.

Elliot.—Mr. G. E. Marillier. Result : Good. Owing to drought it did not germinate well, but given favourable conditions I think it will do well.

Calvinia.—Mr. G. W. Louw. Sown 15th July, 1909. Result : Failure. This grass is too late for the district.

Dordrecht.—Mr. C. A. Smart. Sown December 23rd, 1909. Result : Failure. Overcome by honeycomb grass.

Tulbagh.—Messrs. Z. G. and D. J. du Plessis. Sown June 21st, 1909. Result : Good. This appears to be relished by cattle, in fact they eat it in preference to oathay. It is a fast grower and stands drought well.

PERENNIAL RYE GRASS (*LOLLIUM PERENNE*).

This grass has also shown up less well this year, and the results appear somewhat contradictory. Two of the 1907-08 reports refer to it as a coarse grass, which it certainly is not considered to be, but distinctly the opposite. All permanent grasses are slow to establish themselves, and seldom come to much during the first year, which perhaps accounts for the dubious nature of some of the comments on it.

Further experience of it is necessary before its value can be truly assessed.

Port Elizabeth.—Mr. H. Basil Christian. No date given. Result : Failure. Destroyed by floods.

King William's Town. Mr. Sidney S. McIntyre. Sown May 13th, 1909. Result : Good. After sowing no rain fell for seven months. No plants came up. I also sowed a little in my garden, which was watered and is doing excellently. I have purchased a further quantity to sow this year.

Beaufort West.—Mr. W. J. Vlotman. Sown 15th September, 1909. Result : Failure. Sown broadcast, thinly on irrigated, hard pot clay soil, applied no manure. It came up very well but grew very badly.

Worcester.—Mr. S. F. du Toit. Sown April 27th. Result : Failure. Sowed broadcast. Unirrigated, applied a muid bag of Government Guano to the acre. Took rust badly. I do not consider it suitable or payable.

Bredasdorp.—Ohlsson's Potteberg Farms. Sown May 25th, 1909. Result: Good. Sowed broadcast, thickly, irrigated (water very scarce). Weather very dry during growth. Applied stable and kraal manure mixed. Reaped once in November, about 15" to 18" high. It was not attacked by disease or insects. I consider it will pay if plenty of water is available; all stock relish it.

Grahamstown.—Mr. J. Chapman Moss. Sown 1st September, 1909. Result: Failure. Excessive heat after thunderstorms caused the ground to bake and seeds did not germinate. All the other seeds shared the same fate.

Grigqualand East.—Mr. J. H. Dodd. Sown 28th January. Result: Good. Sown broadcast on unirrigated land, just right time. It is doing very well. The soil is very poor and stony. I had my sheep on it through the winter and they finished it off completely.

Elliot.—Mr. W. E. Gray. Sown October, 1909. Result: Failure. Owing to drought it had not a chance.

PASPALUM DILATATUM.

The rapid growth in popularity which this grass has attained, and the steady demand which exists for the seed both on a commercial and an experimental scale, attest very emphatically the fact that *paspalum* has now gained for itself an assured position in the agriculture of Cape Colony. It is rapidly passing beyond the experimental stage into that of the recognised crops of the country. Its virtues and possibilities, its uses and properties, are now generally understood. The soils on which it thrives, its seasons and the climate that suit it are known. Its geographical limits as well as its natural limitations are alike known, and there is little mystery or doubt left on the subject. *Paspalum* is now recognised as being essentially a summer grass for moist or well watered areas suited to relatively poor soils, and not as a competitor to lucerne on the rich deep Karroo soil subjected always to a very dry atmosphere and occasionally to prolonged drought. Each has its own sphere and each within these is best. In some places, as at the boundary between Karroo and sourveld in the boschjesveld of Robertson district, a hard and fast line can be drawn between the zones of the two crops. Opinions differ with regard to its ability to withstand frost, but generally speaking, except along the coast, *paspalum* ceases to grow in winter and is frequently killed or much injured by severe frosts up-country. A fund of practical experience is contained in the accompanying notes supplied by farmers from all parts of the Colony, giving their opinions formed after full and prolonged trial. The Department has sent out to applicants in all some eight hundred parcels of *paspalum* grass seed, independent of those forwarded for the 1909 experiments, and in spite of the issue of forms to facilitate the furnishing of reports, the only condition attaching to the distribution of the seed, only about 200 returns have been received to date. In the *Agricultural Journal* for September, 1907, a number of these reports were published; and now a further series are here collected for general information. Of the 203 reports received 140 are favourable, some very laudatory indeed; 28 are indifferent or uncertain in tone, and 35 actual failures are chronicled. Difficulty is experienced at times in inducing the seed to germinate, though less so than formerly was the case owing to a better understanding of the needs and habits of *paspalum*. Most of the failures reported are from the high-lying inland parts of the country, from the Karroo where frost is at times intense, water apt to be scarce, and where repeatedly locusts have devoured the experimental sowings. Nothing is to be gained by publishing all the returns in detail, but the following reports on successful results have been selected as being more particularly instructive in character and conveying additional information to that of previous reports.

Stellenbosch.—Mr. James Rattray. Result: Good. Received from Mr. A. C. Buller a bushel basket of *paspalum* in December, 1904. Planted 3 x 3 feet in well prepared soil. Irrigated frequently and cultivated while the plants were small. February following the grain stood 4 feet high, covered with seed. Left standing till June, seed having then dropped out on the ground. Cut off about 4 inches above ground and used for cattle. Tufts then taken out and broken up into single plants, in some instances 100 plants from 1 tuft. These plants were planted on a 12 acre plot of ground, ploughed, sown with barley and harrowed. After barley crop was cut it was found that hardly a single plant had missed. The following spring, seed which had dropped on the original piece of ground germinated. These plants were planted on 36 acres of land sown with rye, with the same results as the previous year. Recovered very quickly if cattle are kept off it for 3 weeks or a month.

Mr. F. R. Marais. Sown August, 1906. Result: Good. Sown broadcast on bed of irrigated mixed soil. Transplanted out in rows and used as green forage. Suitable for district and will pay.

Somerset Strand.—Mr. S. P. Dennyson. Sown: No date given. Result: Good. Seed did not germinate for a considerable time, then suddenly sprang up and grew to a height of 6 feet in 15 months. Very well pleased with it.

Somerset West.—Mr. H. A. de Villiers. Sown May 10th and June 21st, 1907. Result: Good. Sown thickly, broadcast, in beds of clay, sandy, and sand and gravel mixed. Seed germinated best in sandy soil. Suitable for district and will pay. Better to transplant the plant from a nursery.

Plumstead.—Colonel Southey. Sown March and October, 1907. Result: Indifferent. Doubts whether it will answer as a pasture grass, in the light sandy soil and high winds. When eaten off by stock and trampled the winds blow away the sand, leaving a vacant place under the stool. This might be overcome by having the ground more densely covered by the grass and not letting cattle crop it too closely in the dry season.

Diep River.—Mr. J. Carver, J.P. Result: Good. Thinly sown broadcast on irrigated sandy soil. Without doubt it will be a blessing to the Colony if largely grown.

Wynberg Flats.—Mr. C. A. Schickerling. Sown October, 1907. Result: Good. Thinly sown broadcast on unirrigated sandy soil. Transplanted. Very suitable for district and will certainly pay. Excellent for cattle.

Rondebosch.—Colonel W. E. Stanford. No date given. Experiment not satisfactory, due, in my opinion, to very sandy nature of the soil and iron-stone formation at a depth of about 18 inches from surface of the soil. Seed sown broadcast in sandy soil.

Malmesbury.—Mr. S. S. Walters, Vredenburg. Sown 1st August, 1907. Result: Indifferent. Thinly sown broadcast on unirrigated sandy clay soil. Sown late, plants are now stooling. When transplanted during the winter rains it will afford summer grazing, though it does seem hardly enough for the dry nature of the soil. Suitable for district but does not consider it will pay.

Mr. A. Bresler. Sown August, 1907. Result: Good. Planted 200 plants alongside vleis and river. Sandy and clay soil. Is not in favour of *paspalum* for hay, but recommends every farmer who has moist places on his farm to plant it.

Piquetberg.—Mr. E. Cenx. Sown July 15th, 1907. Result: Good. Made two experiments, one on seed bed of good garden soil well manured and the other on camp ground. The seed on the latter came up very badly owing to the dry season, and afterwards died during the drought. The soil was brackish. Those planted in the seed bed were kept well watered but owing to a severe frost one morning half of the plants died, not having enough cover. The other half were more sheltered and are now 3 feet high. When first rain commenced will plant out in the above mentioned camp and will see how they answer.

Mr. J. H. L. Dale. Sown June, 1907. Result: Good. Sown thickly, broadcast on small bed of loose garden soil. From transplants find no difficulty in growing. As a green forage prefers it to lucerne. Suitable for the district if irrigation can be carried on. Will pay, but is afraid it will not stand drought to any extent.

Mr. R. G. Malan. Sown 1st October, 1906. Result: Good. Thickly sown broadcast on unirrigated damp river soil. Very good yield. Suitable to the district and pays better than cereals. Made several experiments on different soils with different treatments at different times of the year between October, 1906 and October, 1907. In winter the safest place to sow is where sheep or cattle have been kraaled, as the manure gives such warmth and dampness necessary for germination, and by the time the rains stop it will be rooted enough to resist drought. Where the land is not properly flooded it has made no appearance yet. For dry lands transplanting is by far the best, though rather expensive. Best to sow seed on lands of a moist nature. Best time for both sowing and planting is from September to the New Year.

Mr. B. F. Burger. Sown August, 1907. Result: Good. Seed came up well. Not grown enough to report on.

Paarl.—Mr. G. J. Hugo. Sown February 27th, 1907. Result : Good. Sown in beds. Planted out on vlei ground in October. Grows well. A very payable grass.

French Hoek.—Mr. B. J. Siebritz. Sown October, 1906. Result : Indifferent. Sown broadcast on unirrigated dry soil. Good grass but is of opinion that it requires a moist or irrigated soil.

Paarl.—Mr. P. M. E. Eksteen. Sown August, 1906. Result : Good. Planted out in April on cultivated ground, grows well.

Porterville.—Mr. Fred. Versfeld. Sown June, August and 1st October. Result : Good. Experimented in several ways. Finds that sowing in drills for transplanting is best. The last five months of the year is the best time for transplanting plants. Pays well on rich irrigated ground or rich marshy ground, and when once established will hold its own against all other grasses. In small camps with irrigation and fertilising just at the start it may prove to the south-western districts as great a boon as lucerne is to districts where soil is suited to that plant.

Tullbagh.—Mr. M. C. Kriel. Sown September, 1907. Result : Good. Sown thickly, broadcast on moist soil. Results prodigious. Most valuable fodder grass he has ever tried.

Mr. A. J. Myburg. Sown 20th March, 1907. Result : Fair. Sown rather thickly in drills on well-manured soil. Planted out in July, not grown more than 8 inches, since being the wrong season.

Warcester.—Mr. S. F. du Toit. Sown January, 1907. Result : Good. From 1 lb. of seed got 100,000 plants. Planted in April to September. Best results in June, July. Does best in stiff clay soil where it stands 3—5 feet high. Sowed considerable quantities of seed treated with boiling water and it is doing well.

Mr. P. J. de Wet. Sown August, 1907. Result : Good. Grass growing well.

Mr. J. D. de Wet. Goudini. Sown 31st December, 1906. Result : Good. Made two experiments, sowing on well-manured ground and sandy soil. The plants on the former came up well, were allowed to seed and then cut down. Seed on the sandy soil came up but did not do nearly so well. Considers it a splendid winter grass, being green and succulent when all others are hard and dry. Seed should be sown on old ground always moist and kept free from weeds. Enclose for about a year to get it well established. Cattle very fond of it.

Mr. P. G. van der Merwe. Sown February, 1907. Result : Good. Sown thickly broadcast on irrigated loose gravel soil, raked and regularly irrigated after sowing. About 6 feet high first growth. Partly grazed off but grew again very quickly. Little growth during winter months. Slightly damaged by frosts. Suitable grass for the district, pays well.

Villiersdorp.—Mr. A. S. Roux. Sown September, 1906. Result : Good. Thinly sown in drills on fertile garden soil. Irrigated. Considers it most suitable for the district and will pay.

Mr. A. P. Lotter. Sown December, 1906. Result : Good. Thinly sown broadcast on irrigated black vlei ground. Splendid grass for district and recommends every farmer with moist land to plant.

River Zonder End.—Mr. Louis Knoblauch. Result : Good. Had some plants given to him which are growing luxuriantly. Judging from the nature of the soil thinks it would answer well on marshy tracts where rich black loam exists.

Montagu.—Messrs. Burger Bros. Result : Good. Seed coming up and growing fast.

Mr. P. H. Burgess. Sown July, 1906. Result : Good. Judging from one experience the best grass for South Africa.

Robertson.—Mr. W. J. van der Vyver. Sown May and September, 1907. Result : Good. Thickly sown, broadcast on irrigated Karroo and river soil. That sown on river soil did best. September is the better month for sowing.

Swellendam.—Mr. J. W. S. Steyn. Sown 15th September, 1906. Result : Good. Thickly sown broadcast on unirrigated light porous sandy soil. It does better by transplanting than by sowing. Suitable for district and will pay well. Is delighted with it, and has ordered 100 lbs. more from Australia.

Mr. C. McGennis. Result : Good. Had been very successful. Is sowing 100 lbs. of seed this year.

Riversdale.—Mr. G. Muller. Sown April, 1907. Result : Good. Thickly sown, broadcast, on irrigated turf ground. Suitable for district and will pay. Just the grass for sour veld as it is sweet. Cattle very fond of it. It is quite as good as lucerne.

Mr. J. C. Truter. Sown January, 1907. Result : Good. Sowed 1 lb. seed. Yield enormous. Though not equal to lucerne will prove a boon to the district.

Mr. J. S. Truter. Sown January, 1907. Result : Good. Sown in drills, irrigated, on black soil with potclay subsoil, well trenched and manured. Suitable to the district on irrigated land and will certainly pay, the yield being enormous. Not equal to lucerne but will prove a boon to the district.

Heidelberg.—Mr. J. Ecksteen. Sown May and September, 1907. Result: Good. Sown thinly, broadcast on unirrigated sour veld and ruggens, well ploughed, harrowed and enclosed. Most suitable to the district and will pay well. Cattle and ostriches like it.

Mr. J. P. Ecksteen. Sown June 6th, 1907. Result: Good. Thinly sown broadcast on unirrigated ruggens potclay and sand. Did not appear above ground until the end of September. Considers it a splendid grass and suitable to the district and will pay. Advises that cattle be kept from it after it is sown until the roots are well established.

Mossel Bay.—Mr. J. S. van Rensburg. Sown October, 1907. Result: Good. Sown in drills on unirrigated sandy soil. Seed just commenced to grow. As far as it has grown considers it a most suitable grass for the district, especially on unirrigated lands.

Mr. W. Howard. Sown 1st March, 1907. Result: Good. Sown thickly in drills on irrigated sandy soil. Grew well in seed-bed. Transplanted in May. Made no growth. Ploughed over in September as a failure. Plants ploughed under are now making vigorous growth. Winter unusually cold.

George.—Mr. J. Groenewald. Sown April, 1907. Result: Fair. Sown fairly thick broadcast on irrigated good black ground. The seed germinated badly but what came up is doing well. Seed should be sown in September. Will probably pay if plants can be got cheaply.

Kynsna.—Messrs. George Parkes & Son. Sown different dates. Result: Good. It is a very good grass for the district.

Grahamstown.—Mr. Edgar H. Rex-Evans. Sown April. Result: Good. Sown broadcast, about 6 lbs. to the acre, on unirrigated black sandy mountain "sour grass" veld. Simply ploughed and harrowed once. Germinated very well. The soil is poor in humus, lime and phosphates, yet the young paspalum plants have made steady growth in this poor untreated soil, with very dry weather all winter and spring after it was sown. The grass will establish itself on this unpromising soil and make a pasture very far superior to the natural or native sour grasses.

Albany.—Mr. J. S. Rippon. Sown March, 1907. Result: Good. Rather thickly sown broadcast on unirrigated sandy soil. Is certain it will be a grand crop for feeding ostriches, cattle and sheep especially in winter, as frost does not effect it and it stands the drought well.

King William's Town.—Mr. G. A. Temlett. Sown November, 1906. Result: Fair. Ploughed the land, rich black soil, about 18 inches deep and harrowed about 1 lb. of seed in. After giving up all idea of its coming up it germinated splendidly and grew well, seeding the same season. When winter set in it was frosted to such an extent that it could be rubbed up to snuff, the natural grasses keeping a green tint all the season. Since the winter it has come on again but has not made nearly the same growth as the natural grasses. The red (rooi) grass is now in seed and the paspalum has not shot up yet. Cattle prefer the common grasses to it. Land not irrigated.

Adelaide.—Mr. J. C. Long. Sown end of May, 1907. Result: Good. Thickly sown broadcast on unirrigated dark clay soil. Sown early and received no treatment after sowing. Seed took about 6 months to germinate. Considers if once established it will grow very quickly and freely. Suitable for the district and will pay.

East London.—Mr. J. W. Venables. Sown March, 1907. Result: Good. Thickly sown broadcast on unirrigated sandy loam. Considers it to be one of the best imported grasses and will undoubtedly do well on the coast belt in this division.

Mr. J. W. Arnold. Sown 5th February, 1907. Result: Good. Thickly sown in drills on unirrigated light soil with gravel subsoil. About 6 acres planted with roots doing well, and 30 acres ploughed ready to plant as soon as rain falls. Most suitable to district and will pay.

Tarkastad.—Mr. L. J. du Plessis, Senr. Sown March 14th, 1907. Fairly thick, sown broadcast on rather poor red soil, irrigable whilst dam has water. Seed germinated very slowly and sparingly. Eaten by locust on four occasions and no grass has appeared since.

Mr. E. G. Adams.—Sown January, 1907. Rather thickly sown broadcast on rather poor red soil, irrigable from dam. Seed grew slowly and rather sparsely. Destroyed by locust on several occasions and has completely disappeared. Appears a strong grass and if once established may prove good.

East Griqualand.—Conservator of Forests. Sown February, 1907. Result: Good. Thickly sown in drills 2 feet apart on stiff clay loam, unirrigated. The whole crop died off to the roots owing to severe frosts. New growth appeared in September, 1907. Suitable for the district during average years but not as winter feeding. Has noticed paspalum growing alongside the path of M'pola Forest Station, Umzimkulu district, and about 18 miles from Kokstad, on uncultivated land. Probably the seed was dropped from wagons on which dry paspalum had been loaded, the wagons afterwards entering the forest for wood.

Kimberley.—Mr. James Dunn. No date given. Result : Good. Thickly sown broadcast on part irrigated and part unirrigated red soil. Flourishes best with a good supply of water. Experiments were mostly carried out on the waste-water irrigation site, and this doubtless accounts for the splendid yield.

Maclear.—Mr. C. H. Bradley, F.C. Result : Good. Will hold its own with any grass. Will stand drought or grow under water for months. Frost destroys it hence it is only a summer feed.

Ugie.—Mr. S. T. Lake. Sown 20th December, 1906 and 2nd December, 1907. Result : Good. Young plants killed by frost. Grows well and thinks it will pay when older. Reported later that it will pay. Makes good winter feeding.

Barkly East.—Mr. S. A. Kleynhaus. Sown December, 1907. Result : Indifferent. Thickly sown broadcast on irrigated land. Very slow in germinating. Foliage killed by frost, probably due to late sowing. Roots may survive.

M. B. J. Tauber. Sown September, 1907. Result : Indifferent. Sown thinly broadcast on very soft (turf) soil. Not yet reaped. Not suitable for humus but for stiffer soil (clay). It is worth another trial.

Wodehouse.—Mr. M. Hockly Halseton. Sown September, 1906. Not suitable to district. Winters too severe. Most of the plants killed outright.

Middelburg.—Mr. H. E. Trollip. Sown 1st March, 1907. Result : Fair. Thinly sown broadcast on irrigated limestone soil. Not too late and harrowed fine after treatment. Only about 50 seeds germinated out of 1 lb. These doing fairly well. Thinks would be a good grass when once established.

Mr. H. Rodgers. Sown January, 1907. Result : Indifferent. Sown thickly in drills on stiff black clay soil, occasionally irrigated. Has not planted out yet for want of rain. Is of opinion that it will not stand frosts, which cut it to the ground at once, and will not stand drought. No doubt it would do well with plenty of rain or if it could be irrigated but will only do as a summer grass. Plants in seed are about 1 foot high. Leaving it to seed so as to try further experiments.

Molteno.—Mr. Cuthbert A. Pope. Result : Good. Plants well established here for some three years on dry sandy soil. Fairly good in summer. Dies down with the first frost and shoots in spring long after the veld grasses. Might do in damp places for summer alone but is of opinion that it is only suitable in Eastern Province where mealies can be grown as a general crop.

Graaff-Reinet.—Mr. E. D. Smith. Sowed in a paddock. Some came up but all disappeared owing to heavy frosts.

Carnarvon.—Mr. C. J. van Zyl. No date given. Result : Indifferent. Thickly sown broadcast on irrigated sandy loam, dug up and well manured. Paspalum should not be grown when there is a chance of growing lucerne. Tried for half a year and obtained about 50 plants. These have just been planted out.

Burghersdorp.—Mr. D. V. Kannemeyer. Sown October 15th, 1906. Result : Good. Thickly sown both broadcast and in drills on irrigated loam sand. Seed sown in drills answered splendidly. Considers it suitable to the district and will pay, but the slightest frost cutting it down will militate against its success; another drawback being the partiality of locusts for the grass.

Barkly West.—Mr. Edward Campbell. Result : Good. Grows well but wants plenty of water to start with.

Vryburg.—Mr. W. H. Edmunds. Sown 27th December, 1906. Result : Fair. Sown on turf seed-beds. Difficult to grow without irrigation. Would do well otherwise, though not so payable as lucerne.

Upington.—Mr. J. A. Haworth. Result : Bad. Set out a lot of young plants in different parts of the veld but fear the climate is far too dry, for very little appears to be alive.

Elliot.—Mr. J. A. Watkins. Sown October, 1906. Result : Bad. Thickly sown on old ground, black soil. No good.

1909 Experiments.

Uitenhage.—Mr. F. Bates. Sown September, 1909. Result : Good. Sown late, unirrigated, in drills, thickly. Kept well cleaned and harrowed frequently, warm weather and nice showers during growth. No manure. Suitable for feeding your own stock. I sowed some seed in August but it was killed by frost. I consider it should not be sown before September and even later if you can irrigate.

Plettenberg Bay.—Mr. H. J. H. Barnardo. Sown 10th August, 1909. Result : Good. Sown in due time. Paspalum and cocksfoot were sown together with oats, the latter was sown first, then harrowed and then the grass sown on top. The oats were reaped and grass and paspalum left and fed off after two months. Land was unirrigated and no manures applied. I consider it very suitable and will pay.

Mr. R. Schmidt. Result : Good. Sown thickly on rich soil had plenty of rain. I consider it suitable if you have lots of rain. No disease.

Uitenhage.—Mr. G. Newton. Sown September 7th, 1909. Sown early, fairly thick on clayey soil. Also ploughed out 4,000 plants. Have moved from district so do not know result.

Willowmore.—Mr. F. J. Scholtz. Owing to drought I had to postpone sowing till next year. Will report later.

Kokstad.—Mr. W. D. Blaine. I omitted to sow last spring (July 12th, 1909). Will report at a later date.

Beeshof, O.R.C.—Mr. F. Rahmer. Sown end of July. Result: Good. Sown right time or perhaps little early in seed bed, irrigated, gravelly soil. Applied heavy dressing of horse manure mixed with soil. No disease. I consider suitable and will pay.

Willowmore.—Mr. J. J. Gooch. Sown 25th October, 1909. Result: Failure. Sown right time in vegetable garden, irrigated, did not germinate.

Humansdorp.—Mr. J. R. Christie. Sown 18th May, 1909. Result: Good. This is suitable and will pay. It is growing well and stools well. I intend to sow more this year. Cattle and horses prefer it to other grasses.

Kokstad.—Mr. G. N. Krag. Sown December, 1909. Result: Failure. Failed to germinate owing to drought.

Swellendam.—Mr. T. Steyn. Sown November 10th. Result. Failure. Failed to germinate.

Cape.—Messrs. Parker Bros. Result: Failure. This seed was sown at all times and in various soils, but failed to germinate in every case.

George.—Mr. Ned Robertson. Sown July, 1909. Result: Good. Sown broadcast, unirrigated. Weather dry till December and very wet since. It is magnificent, and in spite of being continually fed off it overgrows all other grasses.

Mr. C. R. Plumby. Sown April and August, 1909. Result: Fair. Seed sown in August, germinated better than that sown in April, but on the whole only 1 per cent. germinated. It is suitable and will pay.

Caledon.—Mr. S. D. F. de Wet. Sown October, 1909. Result: Indifferent. This grass will pay if irrigated. It came up very badly.

RESCUE GRASS (*BROMUS UNIOLOIDES*).

1907-08 Reports.

Frequent reference to this grass is made under a great variety of local names. It may be described as our best winter annual grass for loose and cultivated land, especially suited for irrigated camps and well worth more attention than it has yet received.

For winter grazing it is particularly valuable. It is found on almost every farm, but it is only very exceptionally cultivated, though much might be made of it if properly attended to. About 40 lbs. of seed per morgen is sufficient.

Stutterheim.—Mr. S. Ollis, Bolo. Sown March, 1907. Result: Good. Great success. Suitable for district and will pay.

Tembuland.—Messrs. J. A. and H. H. Watkins. Sown October, 1906. Result: Bad. Thickly sown, broadcast on well manured black soil. No good.

Mr. O. J. Olivier. Sown December, 1906. Result: Good. Sown thickly broadcast on irrigated heavy black soil. Result: Excellent. Considers that the seed should be sown in spring. Will pay very well. Frost resisting.

Sutterheim.—Mr. W. A. Robinson. Result: Good. Valuable grass. Grows most luxuriantly with moisture during winter months. Frost resisting and appears to be relished by all kinds of stock.

Middelburg.—Mr. H. E. Trollip. Sown March, 1907. Result: Failure. Sown thickly broadcast on irrigated deep alluvial river soil. Came up fair, after a week died off on account of heat. Might do better in a district with different treatment. Does not consider one trial sufficient.

Knyena.—Mrs. Maurice. Sown March, 1907. Result: Good. Thickly sown in drills on unirrigated veld. Seems to have done very well as the piece of ground sown was poor.

Swellendam.—Mr. J. P. Eksteen. Sown May and September, 1907. Result: Indifferent. Thinly sown broadcast on unirrigated sour veld. Might do well on irrigated soil.

Paarl.—Mr. G. J. Hugo. Sown May, 1907. Result: Failure. Sown on unirrigated clayish soil. No crop at all could be gathered from it.

1909 Reports.

Beaufort West.—Mr. W. J. Vlotman. Sown May and September, 1909. Result: Good. Sown broadcast thinly, on irrigated potclay soil. Applied no manure. It is suitable on irrigated land, if given plenty of water, and is excellent for grazing.

Port Elizabeth.—Mr. H. Basil Christian. No date given. Result: Failure. Destroyed by floods.

Elliot.—Mr. J. Laing. Sown March, 1909. Result: Indifferent. This grass keeps beautifully green all winter, but stock do not appear to be particularly fond of it.

Paarl.—Mr. A. H. Schmidt. Sown June 15th, 1909. Result: Good. I find this grass very good for this district, but should be kept away from other cultivated lands to avoid its spreading. I left it to run to seed.

Dordrecht.—Mr. C. V. Swart. Sown December 23rd, 1909. Result: Failure. Overcome by honeycomb weed.

COCKSFOOT GRASS.

The good opinion previously formed of this grass is fully sustained both in the 1907-08 reports and also in those of 1909, which have been received up to the present. It is evidently taking hold in the regions of heavy rainfall, particularly in the Transkei and Eastern Province, though good accounts have also been received from the Western Province. It deserves to be much more extensively known and grown than is as yet the case. Cocksfoot is a tall, strong-growing grass, making excellent hay or grazing. It should be sown broadcast on finely prepared ground at the same season as cereals, and covered over lightly with a bush harrow.

Griqualand East.—Mr. C. H. Bradley. Result: Good. Every farmer in the district should sow this grass. Gave a fine crop for hay. It was sown on light sandy soil not irrigated.

Mr. Kidwell. Sown February, 1907. Result: Good. Sown thickly broadcast on unirrigated light poor soil. Very suitable for the district and will certainly pay.

Stutterheim.—Mr. S. Ollis, Bolo. Sown March, 1908. Result: Good. Grand grass for the district and will pay.

Wodehouse.—Mr. F. H. R. Whillier. Sown December, 1906. Result: Indifferent. Sown thickly broadcast on light loam ploughed and harrowed. Have had no success, very few blades shewing. Have heard from a farmer in the Maclear district that it shews far better the second year. Am doubtful whether this will happen here at an altitude of 5,000 feet and very severe frosts.

Molteno.—Mr. C. A. Pope. Result: Good. This is the grass "par excellence" of all that I have yet tried. Defies all the drawbacks we have here and is spreading rapidly in the low-lying veld.

Tarkastad.—Mr. L. J. du Plessis. Sown March, 1907. Result: Failure. Destroyed by locusts.

Cathcart.—Mr. A. A. Dell. Sown April, 1907. Result: Good. Sown thinly broadcast on unirrigated sandy, gritty soil. Splendid grass for stock especially on the Katberg Range where the ordinary grasses are coarse and sour. Seems best in damp poor marshy soil.

King William's Town.—Messrs. Haynes Bros. Sown November, 1906. Result: Good. Sown thickly broadcast on unirrigated Forest soil. Suitable and will pay. Keeps green through the winter when native grasses are dry and worthless.

Somerset East.—Mr. Colin C. Brown. Result: Good. The very grass for the district, remaining green in winter. Stock eat it greedily.

Wellington.—Mrs. A. Glossip. Result: Failure. Came up sparingly and made no headway.

Worcester.—Mr. P. P. van der Merwe. Result: Indifferent. Thickly sown on irrigated sandy gravel soil. Growth very inferior.

Caledon.—Mr. A. S. Roux. Sown July, 1908. Result: Good. Thinly sown broadcast on irrigated mountain soil. Sowed 2 lbs. of seed, reaped 60 lbs.

1909 Reports.

Paarl.—Mr. I. J. le Roux. Sown 25th May and 25th July. Result: Failure. Sown thinly, broadcast on irrigated sandy vlei soil. Applied kraal manure. I do not think it will pay. The seeds just die off after germinating.

Tembuland.—Mr. C. D. Whittle. Sown February, 1909. Result: Good. Sown broadcast on unirrigated light soil. Splendid for winter feeding. Should be sown in December to stool out properly. Very suitable for this district. Must be sown thick.

Uitenhage.—Mr. A. J. van Deemter, Junr. Result: Failure. Only sowed in May, eaten by locusts and also died owing to drought.

Beaufort West.—Mr. H. Phylers. Result: Failure. This grass is not suitable to the district, as it requires too much moisture. It was sown on the same soil and under exactly the same conditions as a good crop of oathay. The grass died from want of water, and the oats yielded a good crop.

Knyana.—Mr. H. J. H. Barnado. Sown 10th August, 1909. Result : Failure. I do not consider this grass suitable; it cannot be compared to *paspalum*.

Port Elizabeth.—Mr. H. Basil Christian. No date given. Result : Failure. Destroyed by floods.

Elliot.—Mr. W. E. Gray. Sown early in October, 1909. Sown broadcast, early, on light sandy soil. Ploughed once, lightly harrowed after sowing. It does well in this district and farmers are going in largely for it.

Mr. H. J. Gray. Sown early in October. Sown broadcast, early, on light, sandy soil. Ploughed once, lightly harrowed after sowing. It does well in this district and farmers are going in largely for it.

Mr. J. Laing. Sown during January, 1909. Result : Good. Sown broadcast, thinly, at a good time. Ploughed twice and harrowed; unirrigated, light sandy soil. Applied no manure. Sowed 100 acres. Reaped 6,000 lbs. (sowed 1,000 lbs. seed). This is one of the best grasses I have tried. It will feed 10 sheep to the morgan. I would advice mowing in autumn after reaping seed, as it is sank growing and grows too luxuriantly for sheep. It is exceedingly suitable and will pay. No insects or disease attacked it.

Humansdorp.—Mr. G. R. Christie. Sown August 18th, 1909. Result : Good. We are so pleased with this grass that we intend sowing large quantities this year. It is looking well; cattle are very fond of it. It is a strong grass and stands drought well.

Stutterheim.—Mr. W. H. Palmer. No date given. Result : Good. I consider Cocksfoot grass a blessing to farmers in this district who lamb their sheep in June, as it is frost-resistant and keeps green and stands drought well. It is suitable and will pay.

Mr. C. A. Kaschula. Sown 23rd January, 1910. Failed to germinate up to the present; March 14th, 1910, but if it does appear I shall report later. We are raving good rains so it may come up.

DEVON EVERGREEN RYE GRASS.

Of a variety recently brought out only one 1907-08 report has been received. Mr. E. Buck, of Dordrecht, states that it is the best of the three Rye grasses, and looks magnificent. Of the 1909 sowing only five reports have come to hand, only one of which is at all encouraging. The rest are failures due to drought, locusts and too early sowing.

Ugie.—Mr. J. Hedley Dodd. Sown 24th January, 1909. Result : Failure. Owing to heavy rains shortly after sowing seeds must have been washed out.

Bredasdorp.—Ohlsson's Potteberg Farms. Sown 25th May, 1909. Result : Good. Sown late, thickly, broadcast, $\frac{1}{2}$ acre irrigated twice during season. Rolled and had to be weeded twice. Drought kept it back very much; no disease or insects attacked it. Well manured with cow and horse manure. I think it will do well if drought not too severe as it was in this instance. It is still green and looks well. Stock of all kinds are fond of it. Will pay well as a pasture for sheep. It should be sown in April.

Vitenhage.—Mr. A. J. van Deemter, Junr. Sown May, 1909. Result : Failure. Eaten by locusts.

Elliot.—Mr. G. E. Marillier. Sown June 5th, 1909. Result : Failure. Drought.

Peddie.—Mr. H. Cock. Sown January 4th, 1910. Result : Failure. Sown too early in anticipation of January thunder showers, which this year, contrary to custom, only came in February; hence failure.

GRASSES—VARIOUS.

Phalaris bulbosa, *Tall Oat*, *Tall Fescue*, *Teff*, *Bushman's*, *Kentucky Blue*, *Blaauwzaad*, *Sheep's Fescue*, *Australian Meadow*, *Meadow Rice*, *Bermuda Quick*, and *Natal Red Top*. The reports which have up to the present been received on the abovenamed varieties of grasses are too few, and the information contained in them too meagre and uninformative to admit of generalisation. These will therefore be published at a later date when further reports are to hand.

TURKESTAN LUCERNE.

This variety of lucerne is supposed to be hardier and more drought-resistant than the variety usually sown. This fact can only be determined after a lapse of years, but is already mentioned by two observers in the

1907-1908 reports, though too often the mere fact that it is answering is stated. In some instances a preference for the common variety is expressed. Of the reports received to date eighteen are favourable, three are adverse and two failures by misadventure are chronicled. It has done well in districts where ordinary lucerne is not largely cultivated, and promises to serve the useful purpose of extending the area in which lucerne can be profitably cultivated, for many favourable reports come from quite outside the recognised lucerne belt.

Vryburg.—Mr. W. H. E. Edmunds. Sown February, 1907. Result : Good. Advises broadcast sowing early February. Though totally disappearing during the hard part of winter and dry weather, sprouts before the veld. When properly established should be invaluable to the district as early fodder. If irrigated does splendidly, without, should give four to five crops in the year.

Venterstad.—Mr. F. L. Fossati. Sown February, 1907. Result : Good. Suitable for district and will pay.

Indwe.—Mr. F. H. K. Whillier. Sown January, 1907. Result : Good. In spite of 7 months' drought has stood well. Sown broadcast on unirrigated, well-manured, deep black soil.

Colesberg.—Mr. J. A. Will. Sown February 28th, 1907. Result : Bad. Considers ordinary lucerne far superior to this variety.

Atterdal North.—Mr. N. J. Steyn. Sown January, 1907. Result : Fair. Considers it suitable to the district and will pay but not so well as ordinary lucerne. Was twice eaten off by locusts.

Colesberg.—Mr. H. Waldeck. Sown January, 1906. Result : Fair. Eaten down by locusts in March which killed about half the young plants. Considers it as suitable as other lucerne.

Graaff-Reinet.—Mr. A. H. Murray. Sown March, 1907. Was growing well; bed covered by 9" silt owing to terrific thunderstorm.

Mr. Chas. J. Randell. Sown March, April, May, 1907. Failure owing to drought.

Ugie.—Mr. G. R. Watson. Sown December, 1906. Result : Good. Suitable for the district and will pay.

Alice.—Mr. W. J. Dewey. Sown 16th February, 1907. Result : Good. Sown thickly in drills on dry red sandy soil, with rain at the start of growth. Suitable for district and will pay.

Grahamstown.—Mr. Edgar H. Rex-Evans. Sown March, 1907. Result : Indifferent. Sown in drills on unirrigated reddish sandy loam with little if any lime in it. This lucerne has not done so well as ordinary lucerne grown under similar conditions and treatment. Appears to be more delicate in growth and not possess the same vigorous root power as ordinary lucerne which is growing very much better on adjacent ground.

Mr. A. Anderson. Sown March, 1907. Result : Good. Grows well if irrigated. Suitable to the district and will pay.

Macleanstown.—Mr. E. Genis. Sown December 12th, 1906. Result : Good. Consider it very drought-resisting and suitable for the district.

Knysna.—Mr. Chas. Thesen. Sown August 5th, 1907. Result : Good. Should be sown in May or June. Not reaped yet.

Mossel Bay.—Mr. W. Howard. Sown February and October, 1907. Result : Fair. First sowing killed by frost, October sowing coming up nicely.

Barrydale.—Mr. J. B. Nel. Sown July, 1907. Result : Good. Better growth than ordinary lucerne.

Riversdale.—Mr. J. A. Nel.—No date given. Result : Good. Suitable for district. Will pay.

Ashton.—Mr. C. Forrest Rigg. Sown 20th June, 1907. Result : Good. Can perceive no difference between this and Colonial lucerne.

Mr. de Lacy. Sown 28th June, 1907. Result : Indifferent. Might do better on a lighter soil but at present does not shew as well as Tamworth.

Tulbagh.—Mr. J. W. Basson. Sown May, 1907. Result : Good. Suitable for the district and will pay.

Porterville Road.—Mr. R. S. de Villiers. Sown May, 1907. Result : Good. Sowed 4 lbs. of seed. Yield about 700 lbs. Considers this variety superior to either Tamworth or Provence.

Piquetberg.—Mr. G. W. Dunn. Sown May, 1907. Result : Good. Sown on unirrigated mountain soil. Looks very promising.

Mowbray.—Mr. F. Reid Pitts. Sown April 29th, 1907. Result : Good. Plants attacked by leaf spot and dodder. Will report later in the year. From present appearance will have a much heavier crop than either Tamworth or Provence.

Graaff-Reinet.—Mr. Douglas Edwards. Sown March 6th. Result : Indifferent. Germinated well, but would not advice growing in this district. Frost killed it entirely when ordinary lucerne still stands 3 ins. high alongside.

1909. Experiments.

Vitenhage.—Mr. F. Stenteford. Sown December 1st, 1908. Result : Good. Sown late for district, broadcast, thinly on unirrigated black soil. It grows far quicker on black than on red soil. I consider it will pay and intend planting more.

Richmond.—Mr. J. P. Jordaan. Sown October, 1908. Result : Good. Sown early, broadcast, thickly, small bed, reaped March, 1909. Was troubled by red ants. It is suitable and will pay.

Middelburg.—Mr. Claude Southey. Sown February, 1909. Will report again later. Sown broadcast, average thickness, early, irrigated very occasionally. Time too short to say if suitable whether it will pay. I am trying this on two patches against two of common lucerne on land with underground water supply, and whichever is most suitable will plough 300 acres and plant same, so it will be of considerable interest to me.

Piquetberg.—Mr. John Brink. May, 1909. Result : Failure. Violent wind storms blew seed, manure and everything away.

Graaff-Reinet.—Mr. W. Calverly. No date given. Result : Indifferent. This has not grown as well as the other ordinary kinds of lucerne.

Aberdeen.—Mr. Norman Robey. Sown May 7th, 1909. Result : Indifferent. This is not as good as the Provence and has a far less vigorous growth in winter. Locusts relish it, whereas they are not fond of other lucernes.

Alexandria.—Mr. Fred. Crofts. Sown September 4th, 1909. Result : Good. Sown late, in drills on unirrigated, alluvial sandy soil with subsoil of clay. Attacked by disease after second cutting, leaves became spotted and in some cases turned yellow. I found some green caterpillars, but hardly enough to think that they were the cause of disease. It is very suitable and will pay well.

Calvinia.—Mr. J. W. Louw. Sown 1st August, 1909. Result : Good. This lucerne grows beautifully here and promises to beat the ordinary kind which we have.

Aberdeen.—Mr. Harold Glennie. Sown July 15th, 1909. Result : Failure. Sown broadcast. Soil 6' to 8' deep. Owing to extreme drought I was unable to water it. It germinated well and if I had been able to water it in September or October I am sure it would have been an unqualified success. I will try it again.

Humansdorp.—Mr. C. du P. Vermaak. Sown June 25th, 1909. Result : Indifferent. Sown early in drills 14" apart. Irrigated, reaped 9th November, 1909. Yield 845 green. Dimensions of land sown 20 yards x 26 yards. I do not think it suitable and will not pay. Several of my fellow farmers have sown it and informed me that it is not suitable for our district and will not sow it again.

Calvinia.—Mr. H. Buhr. Sown May, 1909. Result : Good. I think it suitable and will pay. I sowed it alongside of ordinary and find it makes far better growth.

Beaufort West.—Mr. J. P. Devenish. Sown May 13th. Result : Good. Sown late, broadcast, on irrigated sandy soil. Reaped November 1st, yield 100 lbs. cold, windy and frosty weather. Dimensions of land sown 30 feet x 40 feet. It is suitable and will pay. It is a very hardy plant, withstands drought and frost well.

Grahamstown.—Mr. P. J. Norden. Sown May, 1909. Result : Good. Sown late, in beds, thickly, irrigated in July, 60 yards x 12 yards. Reaped September, 1909. Did not weigh yield. It is suitable and will pay when once established.

Clanwilliam.—Mr. Carl Wagener. Sown July 1st, 1909. Result : Good. Sown broadcast, thinly, early on black soil. Reaped 25th November, 1909. Yield very good. I think it is a very good lucerne for our district and will pay well.

Beaufort West.—Mr. H. Phybers. Sown 15th April, 1909. Result : Good. Sown Turkestan lucerne is very suitable for this district and will pay better than any other kind as it is more drought-resisting. I sowed it on the 15th April, 1909, and reaped in November, 1909. Did not weigh yield.

Albert.—Mr. S. Terbugh. No date given. Result : Failure. Floods.

Kimberley.—Mr. N. Aucamp. Sown November 10th, 1909. Result : Indifferent. I do not know whether I sowed it early or late. I cut it once. It is suitable and will pay.

Oudtshoorn.—Mr. W. J. Northcott. Sown May 4th, 1909. Sowed a month late (best time being March). Irrigated every fortnight until it attained sufficient growth. I fed it off with sheep as I find it has a good effect on lucerne. I will it run to seed and will report to you again later.

Fraserburg.—Mr. D. Hodgson. Sown December 2nd, 1909. Result : Good. Sowed right time, broadcast, irrigated, weather dry, clay soil. Applied 20 mud bags kral manure to the plot of 60 square yards. If farmers only knew the value of a plot of lucerne they would not hesitate to sow it. It is as good as any other kind of lucerne. I notice that the seed contained a kind of clover mixed with it. I enclose a sample under separate cover. It has a bad smell and taste, and gave me a great deal of trouble to eradicate.

Uniondale.—Mr. D. Keyser, D.son. Sown August 15th, 1909. Result : Good. It grows and answers splendidly.

TAMWORTH LUCERNE.

This lucerne comes from the Hunter River District, of New South Wales, and is supposed to be a specially coarse growing, robust and luxuriant variety. So far as these reports go it seems no better and no worse than any other variety, but gives a coarser hay, the majority of failures being cases in which in all probability any sort of lucerne would have done equally badly.

Cape.—Mr. Louis Hardwick. Sown April, June and September. Result: Good. Suitable to the district and will pay. Seed planted in April, June did splendidly. September is too late.

Mr. T. Reid Pitts. Sown April, 1907. Result: Indifferent. Sowed 4 lbs. on one-eighth of an acre of unirrigated dry white sand. Very badly affected by leaf spot. Necessary to sow about 25 lbs. to the acre on this class of soil. Will report on this crop later.

Stellenbosch.—Messrs. Alderman Bros. Sown October, 1907. Result: Good. Have had it growing on their farm for 6 or 7 years, and continually using it as green forage for milking cows.

Tulbagh.—Mr. J. W. Basson. Sown July 30th, 1907. Result: Good. Suitable to the district and will pay.

Knysna.—Mr. Chas. Thesen. Sown July 1st, 1907. Result: Good. Now ready for second cutting (7/12/07).

Mr. J. Kapp. Sown October 9th, 1907. Result: Good. Sown broadcast on unirrigated bush soil, practically new ground. Result: Excellent. Will pay.

Captain H. Thesen. Sown June 20th, 1906. Result: Good. Sown in drills 22" apart on unirrigated, about 8 inch black heavy soil, covering sandy pot clay, well manured. Very successful, will certainly pay.

Mrs. Maurice. Sown February or March. Result: Bad. Sown thickly in drills on unirrigated veld. Wet first, then very dry. Growing side by side with serradella. The latter doing very well, the lucerne withering and not growing to any height.

East London.—Mr. C. J. Forrester. Sown October, 1907. Result: Indifferent. Thinly sown both in drills and broadcast on unirrigated rich black soil. Same up well but has been at a stand still ever since.

Alice.—Mr. T. Hewson. Sown November, 1907. Result: Good. Suitable for district and will pay. Cattle and birds do well on it.

Fort Beaufort.—Mr. J. W. Stephenson Jnr., Kroomie Siding. Sown September 1st, 1907. Result: Good. Crop looking well and should give a heavy return. Suitable for district.

Stutterheim.—Mr. E. C. Fletcher. Sown July, 20th. Seed sown on unirrigated heavy black soil. Germinated, then died off owing to spell of dry weather. Considers it suitable to the district if grown on irrigated land.

Mr. N. McNiel. Sown February. Result: Indifferent. Germinated well but unhealthy. Destroyed by insects.

Grahamstown.—Mr. R. W. Elliott. Sown May 6th, 1907. Could not establish itself. Weather too dry.

Cradock.—Mr. Alf. Metcalf. Sown February. Will pay as well as other lucerne, but no better. Need as much irrigation.

Queenstown.—Mr. J. Bosman. Result: Good. Suitable for district and will certainly pay.

Graaff-Reinet.—Mr. A. H. Murray. Sown March, 1907. Result: Good. Suitable for the district. The lucerne was growing nicely when it was covered with 9 inch silt owing to terrific thunderstorm.

Vryburg.—Mr. Chas. D. Taute. Sown March, 1907. Result: Good. Given a fair start and the droughts not lasting too long, lucerne will do fairly well in certain places in the district.

Bredasdorp.—Mr. D. P. du Toit. Sown January 15th, 1907. Result: Good. Suitable for district under irrigation and will pay.

Ugie.—Mr. L. V. Kidwell. Sown January 15th, 1907. Result: Good. Suitable for district under irrigation and will pay.

Ashton.—Mr. J. de Lacy. Sown June 28th, 1907. Result: Good. Suitable for district and will pay.

Piquetberg.—Mr. R. S. de Villiers. Sown May, 1907. Result: Good. Sowed 4 lbs. Yield 450 lbs. Growth slower and not so good as Turkestan.

Other Lucerne.

Ashton.—Mr. Danie de Wet. (*Turkestan and Tamworth*). Sown August. Young plants blown away by wind.

Knyana.—Mr. Chas. Thesen. (Provence lucerne). Sown 16th December, 1906. Result: Good. Sown thickly in drills on unirrigated, well cleaned, worked and manured sour veld. Now ready for cutting (7/12/07) for the fifth time. The best he has seen in the district.

Mr. Chas. Thesen. (Oudtshoorn seed). Sown May 24th, 1907. Result: Good. Will do well sown in drills in clean, well-worked and manured sour veld.

FRENCH LUCERNE.

Thirteen reports on this variety have been received up to date. Eight of these show good results, two indifferent and three failures, due principally to drought. Only a few reports have been received on Provence lucerne and only one on *Medicago arborea*, and as these are of very indifferent and uninformative nature, the results of these varieties will be published at a later date when more reports are to hand.

Humansdorp.—Mr. C. du P. Vermaak. Sown June, 25th, 1909. Result: Good. Sown early in drills 14 inches apart on irrigated, rich, light, sandy soil (alluvial) new ground. Applied no manure. Weather very unfavourable, heavy frosts, dry windy days. It is suitable because it grows quicker than any other kind of lucerne, and will pay. I think it is one of the best kinds of lucerne, grows quicker than Turkestan and starts its spring growth earlier. I measured the roots which are 20 to 24". It was 16" to 24" high when cut. Reaped 30th October, 1909. Yield 12,000 lbs. green. Weight of seed 3 lbs.; dimensions of land sown 20 yards x 26 yards.

Grahamstown.—Mr. P. J. Norden. Sown May, 1909. Result: Good. Sown a little late in beds 6 yards x 12 yards, irrigated, soft loam soil. Grew splendidly, reaped September, 1909. Did not weigh yield, second cutting in two weeks' time (date of report 21/10/09). It is suitable and will pay.

Caledon.—Mr. R. Metcalfe. No date given. Result: Indifferent. I cannot say that I prefer it to ordinary lucerne.

Cape.—Messrs. Cairncross Bros. Sown 14th June, 1909. Result: Failure. Sown in drills on unirrigated light loam soil, trenched. Crop grew fairly well at the start, but eventually dried up owing to drought. It may do well on heavier soil here.

Caledon.—Mr. H. V. Veale. Sown November 10th, 1909. Result: Good. On account of drought the crop was very light, but given good seasons I think it would do well.

Uitenhage.—Mr. H. P. Matthews. Sown June, 1909. Result: Good. Doing well.

Uniondale.—Mr. D. Keyser, D. son. Sown August 15th, 1909. Result: Good. It grows and answers splendidly.

Piquetberg.—Mr. P. Mosel. Sown May 3rd, 1909. Result: Good. It is very good for horses and cattle.

Albert.—Mr. S. Terburgh. No date given. Result: Failure owing to floods.

Kimberley.—Mr. H. Aucamp. Sown November 10th, 1909. Result: Good. It is suitable and will pay.

Fraserburg.—Mr. N. F. Hodgson. Sown May 19th, 1909. Result: Good. Sown thickly broadcast on irrigated clay soil. Applied stable manure. It is thriving well. I have sowed it three times. It is very suitable and will pay.

Worcester.—Mr. W. J. Viljoen. Sown August, 1909. Result: Indifferent. The seed was not pure as two kinds of foreign grasses came up with the lucerne.

CLOVERS (*TRIFOLIUM* SP.).

The group of clovers are not well understood, and hence scarcely sufficiently appreciated by our farmers. Comparison with lucerne is invidious, and nothing is likely to be met with which will surpass that crop on soils and situations suitable to it. But even lucerne has its limits, and it is just beyond these that clovers sometimes have their proper sphere. Some are permanent like lucerne, others, like Crimson, only annual, and therefore well fitted for being sown in land regularly used for other crops, wheat, barley, oats, mealies, beans, potatoes and the like, as a forage crop and as an enricher of soil. The perennial clovers are specially to be recommended to be added to mixtures of grass seed for the purpose of forming artificial pasture, appearing annually at their proper seasons and vastly augmenting the value of such grazing land. Clovers will doubtless take their place in our agriculture for the improvement of pastures, especially the moist vleis and home paddocks where stud stock and young

lambs, calves or ostrich chicks are kept. It is impossible to over-emphasize the necessity for thorough preparation of the ground and for providing a fine seed-bed for all clover seeds. Protection in the form of a nurse crop of barley, oats or rye is sometimes desirable during the early stages of growth, especially on land that blows badly. As a rule clovers form only part of a mixture of seeds sown, but as a general guide if sown pure the quantity required is from 15 to 40 lbs. per morgen. Giant White Clover, Red Clover, and Alsike Clover are perennial, but do not last as long as lucerne will under favourable conditions.

RED CLOVER (*TRIFOLIUM PRATENSE*, L.).

The reports, both good and bad, are published *in extenso*, as they demonstrate very clearly the fact that, while evidently well suited to sweetveld, especially in the eastern part of the Colony where summer rains prevail, it is less suited to the sour veld. Red clover will find an important place amongst our forage crops on good irrigable or naturally well-watered soils as supplementary to lucerne, which it in many respects resembles. This crop is decidedly worth the attention of farmers of sweet and broken veld, especially on deep fairly rich soils.

Ugie.—Mr. S. T. Lake. Sown December 2nd, 1907. Result: Good. Sown thickly, broadcast on unirrigated good soil. Suitable for district and will pay. One of the best crops for winter feeding. Better for this district than lucerne as no insects attack it, and it grows well.

Mr. C. N. Lake. Sown 3rd December, 1906. Result: Good. Sown broadcast and thickly on unirrigated land. I consider it suitable for the district and will pay. Lucerne has been destroyed by grubs and the Red clover has never been troubled by the grub or any insect.

Cala.—Mr. P. Morris, Snr.—Sown January. Result: Good. Suitable for district. *Mount Frere*.—Mr. J. H. Bennington. Sown September, 1906. Result: Good. Sown early—very wet. Not attacked by insect or disease. Consider it good for district and should pay. Grew better than Alsike or Crimson clovers.

Bolo.—Mr. S. Ollis. Sown 12th March, 1907. Result: Good. Sown broadcast on irrigated light brown soil. Plants growing strong. Fed off.

Aliwal North.—Messrs. Sweetman Bros. Sown November, 1906. Result: Good. Sown on black pot clay ground and storm water covered it for a time. It grows well enough but is not liked by the farmers in the district. Came up rather thin so did not reap it but let it ripen and seed. Grows very well and nothing seems to interfere with it.

Beaufort West.—Mr. G. P. Pienaar. Sown 1st August, 1906. Result: Good. Suitable for district and will pay very well. Weather cool and rainy. Reaped early in October, very healthy. Greedily eaten by sheep, goats, horses, etc.

Rosemead.—Mr. W. E. Collett. Sown November 6th, 1906. Result: Indifferent. Sown broadcast and thickly on irrigated land. A very few plants saved after the locusts' attacks. These look well. I have some of the seed on hand which I intend to sow again and will report later.

Fort Beaufort.—Mr. H. A. Morgan. Sown 4th October, 1906. Result: Good. Eaten by locusts. Stock are fond of this clover and I think this crop will do well in this district.

Bedford.—Mr. A. G. King. Sown February, 1907. This seed did not do well.

Cathcart.—Mr. H. de Wilton Smith. Sown November to February, 1907. Result: Bad. Sown thickly and broadcast on unirrigated land. Died off when making second leaf. Apparently too wet. Unsuitable and will not pay in this district.

Cathcart.—Mr. A. A. Dell. Sown April, 1907. Result: Bad. Only one stool came up, a miserable stunted-looking plant. No good for this part of the district.

Grahamstown.—Mr. A. A. Douglass. Sown 31st July, 1906. Result: Good. Suitable for district and should pay. Was sown 12th December, 1906, and two weeks later was ready for another cutting. Excellent fodder for birds.

Grahamstown.—Mr. W. W. Gradwell. Sown 2nd June, 1906. Result: Indifferent. Not sufficient rainfall in early spring when most wanted. Not suitable for district as it is too dry.

Uitenhage.—Messrs. Martin & Co. No date given. Result: Good. Sown in drills on irrigated land. Cut green for pigs and cattle. Suitable and will pay in this district. Lasts longer here than at home if cut before it gets too old. Can obtain three crops from one sowing. As it is an annual it should be sown as a catch crop on a piece of stubble and lightly harrowed in or rolled. A very useful plant to plough in for manure.

Port Elizabeth.—Mr. Robert Nance. Sown, No. 1 28th March and 15th September; No. 2 10th August. Result: Failure. Not suitable. No. 1. Burns up, with not extreme heat. Sown on sandy coast ground. No. 2 Brak vlei ground. Came up well but seemed to rot away.

Humansdorp.—Forester Rex. Sown 15th October, 1906. Result: Poor. Sown broadcast on irrigated land. Reaped March, 1907. Fed off by cattle and pigs. I do not think it will pay, soil too poor here. The object of my trial was to raise a crop on poor soil.

Knysna.—Mr. J. J. Hooper. Sown April and July. Result: Bad. Grew well and came into flower, when then attacked by rust in November and was totally destroyed. Weather very hot.

Mr. E. Bibby. No date given. Result: Bad. It grew well until the land got dry, then died off. Not suitable for district.

Mr. Frank Franzen. Sown February, 1907. Result: Failure. Sown very thickly in drills on unirrigated sandy soil. Attacked by an insect from commencement and choked by weeds (zuuring).

Mrs. Marice. Sown March, 1907. Sown thickly broadcast on unirrigated, slightly manured veld. Came up splendidly. Suitable for the district.

Mr. H. Taplis. Sown March 25th and October 10th, 1907. Result: Bad. Sowed broadcast on unirrigated sour veld. Came up thinly and doing badly.

Bredasdorp.—Mr. J. D. Albertyn. Sown 5th June, 1906. Result: Poor. Sown broadcast and thinly on unirrigated land. Seed came up. I consider it unsuitable for district as it must be irrigated, and lucerne is more profitable under these conditions.

Caledon.—Mr. J. S. Le Sueur. Sown 29th August, 1906. Result: Indifferent. Sown broadcast and thickly on unirrigated soil. Seed germinated badly and died off during drought. Owing to exceptionally dry weather last winter it is difficult to form an opinion of its suitability or otherwise.

Mr. J. J. de Villiers. Sown 10th July, 1906. Result: Poor. Sown broadcast on unirrigated land moderately thick. Not very promising when sown at this date. Poor growth. If it can stand frosts should be sown in autumn, otherwise in spring under irrigation. If the latter method is the only successful one, it is practically valueless in this locality.

Tulbagh.—Mr. G. J. Euvrard. Sown end of June. Result: Good. Can say nothing as to whether the crop will be a paying one as I was obliged to turn a lot of sheep into the paddock. Still green and sheep seem very fond of it. Exceptionally dry weather. Quite healthy.

Wellington.—Mr. P. J. D. Wessels. Sown 29th May, 1906. Result: Bad. Sown broadcast and fairly thick. Attacked by "aardfloe" in July, not reaped. Do not consider it suitable for district. It wants to be sown where it can be well watered.

Heimon.—Messrs. A. J. Bresler & Co. Sown 25th June, 1906. Sown broadcast and thickly, twice harrowed, applied superphosphate. Seed did not germinate at all, hence unable to judge of its merits.

Paarl.—Mr. A. H. Schmidt. No date given. Result: Bad. This clover will not do. It is very slow growing and when cut takes long to settle again.

Parow.—Mr. G. J. Bredenkamp. Sown late June. Result: Bad. Sown broadcast thickly, weather a little dry, completely destroyed by red spider in early stage of growth.

Villiersdorp.—Mr. A. P. Lotter. Sown November 1st, 1906. Result: Good. Sown broadcast on irrigated black vlei ground. Grows all the year if irrigated. Not attacked by any insect when lucerne was completely devoured by caterpillar. Particularly suited for vlei ground. Is of opinion that clover should be sown in small camps especially for pasture and green forage.

Port Elizabeth.—Mr. D. F. Mobbs. Sown August, 1909. Result: Indifferent. I cannot say if it is suitable. The soil is very poor here.

Grahamstown.—Mr. J. Chapman Moss. Sown September 1st, 1909. Result: Failure. I think it suitable and will pay, but excessive heat after thunderstorms baked the soil and seeds did not germinate.

Jansenville.—Mr. R. F. Skinner. Result: Failure. Drought very severe.

Humansdorp.—Mr. G. R. Christie. Sown 18th August, 1909. Result: Good. It has made good progress and is now (17/1/10) in flower, about 15" in length. It is suitable and will pay.

MILK RECORD.

ELSENBURG COLLEGE HERD.

Subjoined is the Milk Record to the 31st May, 1910 :—

Breed and Name of Cow.	Days in Milk.	YIELD IN LBS.		
		During May.	Total to date.	Daily Average.
FRIESLANDS.				
Bell	311	366	8,692	27·9
Belladonna	274	176	4,425	16·1
Rose	207	339	5,178	25·0
Beauty	126	573	2,876	22·8
Victoria	74	863	2,193	29·6
Cleopatra	38	1,313	1,597	42·0
JERSEYS.				
Gus	267	23	4,483	16·8
Fanny	255	26	3,839	15·1
Glee	226	312	3,578	15·8
Gertie	51	647	1,135	22·2
Gwendolen	32	694	713	22·3
Gladys	25	519	519	20·8
Grace	25	580	580	23·2
SHORTHORN.				
Maggie	321	309	7,040	21·9

THE FUTURE DEVELOPMENT OF AGRICULTURE IN SOUTH AFRICA.

By P. J. DU TOIT.

The Union of the Self-governing Colonies will probably create, *ipso facto*, a forward movement to which the spirit of enterprise that has arisen since the war, will serve as a vigorous root-system. The soil has been well prepared for quick growth, and the wider outlook which Unification brings about is like so much ground cleared round the new tree. The varying restrictions on interstate trade in agricultural products which the Provinces impose against each other, though to some extent beneficial, produce irregular development: Cape Colony impedes the cattle traffic of the Transvaal and the Orange Free State and the cattle, sheep and fruit traffic of Natal; the Transvaal restricts the cattle, sheep, fruit and vegetable trade of the Cape; the Orange Free State regulates the movement of cattle and sheep from the Cape and prohibits the introduction of cattle from the Transvaal and Natal; and Natal considers it necessary to restrict the introduction of horses, cattle and fruit from Cape Colony. One Government does not feel disposed to take responsibility for the acts of another, and therefore takes steps to safeguard the interests of its own territory (in many cases already safeguarded by the exporting Province). It will doubtless be the care of those in authority so to act in future that, while giving reasonable protection against disease to the various members, trade will be fostered and improvement encouraged along lines that will give as far as practicable an even opportunity to all producers.

The staff employed by the Provinces *against* each other makes a respectable total; engaged *for* South Africa they should be an appreciable aid to development.

Instead of one Province comparing its achievements with another in this country, South Africa will look for comparison to the Commonwealth of Australia, the Dominion of Canada and the Argentine Republic. But South Africa will develop along lines peculiarly its own; even each Province will promote different enterprises in different degrees. There is a tendency at present to expect one Province to do as another does. Take a rainfall map of South Africa and draw a straight line from the North-Western portion of Cape Colony to the sea-board of Natal; then note the progressive increase of rainfall from under 5 inches to over 40 inches a year! Draw another line almost perpendicular to the other from Port Elizabeth through the Orange Free State to Pretoria, and note the changes from 21 inches at the coast to 17 inches in the Midlands of Cape Colony, to 25 inches at Smithfield (O.F.S.) to 27 inches at Kroonstad (O.F.S.) to 20-30 inch in the Transvaal! In addition we have to take into account altitude, physical features, etc. Let each farmer know his own farm, the inhabitants of each district the capabilities of their district, and the people of each Province the possibilities of their Province, and development will proceed, if wisely directed, in the manner best suited to each locality. Area for area, one Province is likely always to lead in mohair, ostrich feathers, and most of the cereals and fruits, another in dairy produce, mealies and perhaps in wool, another in sugar and tropical fruits, and so on.

Under Union we may hope that progress will be stimulated in different ways in different centres; but one agricultural policy will influence, one aim—each portion for the good of the other—will permeate the whole: agriculture for the benefit of stock; stock for the benefit of agriculture; both for the benefit of the railways; the railways for the benefit of both; mining for the benefit of farming; farming for the benefit of mining; and all for industrial and commercial development.

An agricultural policy will depend for its practicability and its success upon *organisation*, and for its life upon the motive power of *education*. The latter will be the life-blood of the agricultural body, and organisation its arteries and its veins. The Branches of the Department of Agriculture will form the arteries through which education will reach the remotest corners of the Union, and the farmers' associations the veins through which will circulate the information which the various Branches will supply. A properly organised Department will give scope to and place responsibility on the various divisions composing it: will develop within each division pride in its work and regard for the success thereof; and will give evidence of working as a harmonious whole and not as a heterogeneous agglomeration. Well organised associations of farmers—in which respect Cape Colony has a noteworthy lead—will be the means of conducting that information to all their members. There are about one hundred and ten such bodies in Cape Colony; and the Board of Agriculture which is being constituted will organise their work so as to make them live entities. For healthy development in agriculture self-reliance has to be insisted upon and initiation quickened, and the constant aim towards these ends must be *education*—in colleges and schools for the farmers of the future, and for those already on the soil by means of publications, lectures, shows, exhibits, experiments and demonstrations and, not least, the press.

The education of the farming community embraces the vigorous prosecution of research work—the properties of our different soils, the productive capacity of these soils, improved methods of cultivating them, the prevention and cure of animal diseases, the adaptability of various fruit trees to different localities, the treatment of diseases of fruit and the destruction or keeping in check of insect pests, the breeding of cereals most suitable to this country, the trial of new varieties of seed, and of new crops, the most advantageous use of water, and several matters of smaller import.

The rapidity with which money disappears when its equivalent in value is misapplied to the soil renders caution and conservatism necessary to stability in farming. On the other hand, reasonable certainty of increased returns from some new method is a powerful incentive to the adoption of the change. The lever to be used in advocating that change is therefore the money value which it may be expected to yield. The farmer in general has no time for problems, scorns theories, but eagerly seizes on demonstrated facts.

Every advance opens out upon a new series of possibilities. From improvement in dairying has sprung artificial feeding of cattle, cultivation of fodder plants and rotation of crops; export of maize and oats has given rise to the use of improved machinery, better seed and advanced methods of cultivation; progress in the production of ostrich feathers has given a remarkable impetus to the cultivation of lucerne and to irrigation; the establishment of an export trade in beef and mutton and, as a necessary adjunct, increased production of fodder crops may bring about the impounding of flood water for raising those crops and be the inducement required for stopping erosion of the soil. The natural feeding of stock is probably responsible for most of the slooting; the artificial feeding of stock may supply the remedy.

AGRICULTURAL AND VITICULTURAL PRODUCE—PRODUCTION—(contd).

State.	Year.	Wine.	Brandy.	Raisins.	Sugar.	Tea.
		leaguers. (not known)	leaguers.	lbs.		lbs.
Transvaal ...	1908	...	...	...	...	...
Orange Free State	1904	...	...	...	...	...
Natal ...	1908	...	...	...	35,832 tons (short) 3,835,090 lbs. (Molasses, etc.)	3,278,464
Cape Colony ...	1909	27,302	5,274	2,198,089 (1908)	...	...

First as to pastoral products and animal husbandry. Our greatest industry, wool, we have reason to expect a prosperous future for. Woolled sheep of the highest value not only continue to be imported but are being imported to a greater extent. In the Transvaal and the Orange Free State this is done chiefly by the Government; and in Cape Colony by private enterprise, there being no need for the intervention of the Government. Much attention is now devoted by farmers to general improvement in the class of animals which they breed and in the preparation of wool for the market, and buyers oversea are taking more notice of South African wool. Artificial feeding of stock is resorted to increasingly year by year; it will probably have its greatest incentive from an export trade in mutton and lamb; and the country will thereby be able to carry a larger number of small stock. The gradual fall in the price of mutton is probably one of the healthiest indications in the development of our agriculture. At the same time there are far too many non-woolled sheep in the country and unfortunately the latest statistics show that the non-woolled sheep have increased in a somewhat larger proportion than the woolled. This, however, is due to the large area where non-woolled sheep are principally raised having had exceptionally fine rains during the past two years.

South African mohair is improving in quality and increasing in quantity. With advancement of the wool industry will concurrently go progress in the production of mohair: the two will go hand in hand. Although grazing which is suitable for sheep is often unsuitable for angora goats, yet irrigation and cultivation for one branch of stock-raising will influence similar undertakings for another branch.

The ostrich feather industry is bound always to cause anxiety, less on account of the increase in production in Cape Colony, which has practically a monopoly of the export trade, than of competition from a country such as the United States of America. Dividing the last twenty years into four periods of five years each, the production has increased from 255,000 lbs. per year on an average in 1890-1894 to 650,000 lbs. per year in the period 1905-1909, and yet the price per lb. has risen from £2 to £2 10s. The market has extended widely in that time and, as far as can be ascertained, our export trade is divided among the consuming countries as follows: the United Kingdom, 31 per cent.; the United States of America, 31 per cent.; France, 22 per cent.; Germany, 11 per cent.; Austria-Hungary, 3 per cent.; and Holland 2 per cent. It may be ostrich farming may not be able to prosper in America as it does in Africa. If, however, it does, this country will hold its lead for many years to come. Still, it is hardly to be expected, our stringent export prohibition law notwithstanding, that South Africa can retain its monopoly indefinitely. At present the market can absorb all we produce, at

most remunerative prices. Our safeguard lies in maintaining pre-eminence in quality and in extension of the market. The United States have at present about 10,000 ostriches, or less; in order to capture from us its own present market, it requires to have 200,000 birds, and these of the quality of our own.

Dairying in South Africa was, until a very few years ago in a languishing condition, and we seemed to be extremely slow to realise what advantages it would bring. Like in cultivation of the soil, in poultry farming and in pig breeding, we wished to improve the industry from the wrong end: we preached improvement of cattle, and on a small scale the improvement did take place; but we failed to appreciate the fact that by translating the product (milk) into cash, and, by producing more butter and cheese, and these of better quality, the greatest possible inducement would be given for the improvement of the milk producer; and this notwithstanding that we had the examples of the wool, ostrich feather and mohair industries before us! The value of an article depends upon the use it is put to; its quality will be improved when there is value to be got out of it. Dairying will afford greater indirect benefits to this country than the ostrich industry has done. More crops will be grown for feeding cattle; more foodstuffs will be preserved as hay and as ensilage for times of scarcity and drought; the cultivation of cereals will be assisted; the feeding of other stock also will be done more extensively. Direct results will be the breeding of better milkers, the weeding out of inferior ones, and the cheapening of our meat, our butter and our cheese. In a preceding page the writer has referred to exportation of beef and mutton. It will probably be found that cessation of butter imports, that is, the supply in South Africa of such a quantity as will reduce the price at the dairies to at most one shilling per lb., perhaps eleven pence, will precede such exportation, which is dependent, for continuance, on the artificial feeding and the lowering of cost which dairying will bring about. The improvement in dairying is rapid throughout the country. Co-operative Dairies are springing up in a good few centres, and movements are on foot for the establishment of several others.

Poultry farming is at present relatively in the same position as cattle-raising was before creameries were established. The marketing of eggs is made incidental to improving the stock instead of being made the chief aim and incentive of the latter. As has been the case in other countries, the systematic collection and sale of eggs must precede poultry farming on improved lines on an extensive scale. Here again dairying will come to our aid; the conveyance of milk and cream to dairies and creameries will facilitate such collection and distribution. All honour and praise to the enthusiasts who introduce and breed high-class stock and year-in and year-out advocate the keeping of pure-breds and of the best laying strains. Will dairy farmers and creamery managers come to their assistance?

It is an extraordinary fact that with the increase in the number of pigs, the importation of ham and bacon has risen also. Once more dairying will assist; it will open the way to ending this anomaly by inducing the use of the waste product of the dairy for feeding pigs and thereby rendering the manufacture of ham and bacon profitable.

Great progress has been made in recent years in the production of mealies; but as regards other cereals, while the same may be said so far as the last five years are concerned, there was, at any rate in Cape Colony, a gradual decline between 1891 and 1904; so much so that we have only now arrived, in that Colony, at the position we occupied in 1891! The chief problems before the grain-grower are more scientific manuring and better cultivation: how to make his soil produce more. Dry farming,

which is a specific form of better cultivation, is one means; using improved machinery for applying fertilisers and seed to the ground is another. Experiments are being made on a large scale, and information is fast being spread in regard to these; and the outlet given by exportation of mealies and oats will supply the stimulus needed to take advantage of these methods.

Many small irrigation schemes have been carried out within late years, nearly all by individual farmers, by which fairly considerable areas have been brought under the plough. Many more irrigation works are in progress of construction or in contemplation; and the recently formed Irrigators' Association will doubtless influence agriculturists still further in this direction.

The whole country has awakened to agricultural development; but population and extension of our railway system are required in order that large fertile areas, such as Bechuanaland and the Native Territories of Cape Colony, may yield the returns they are capable of producing, or at least a goodly portion of them.

Probably more energy has been put into fruit culture than into any other industry, comparatively speaking, in the past fifteen years. The oversea exports are still small, but the total exports from Cape Colony and Natal in 1909, namely, £159,225 and £108,146, are respectable. The oversea exports have, however, led to the adoption of proper methods of grading and packing, which have had their influence on the fruit trade with the sister provinces. It is to dried fruit that attention should be more devoted; but also in regard to this article an encouraging advance was made in the past year or two. In 1909 British South Africa imported dried fruit of all kinds to the value of £55,343, and bottled and tinned fruit to the value of £16,702. Not only should the South-western districts of Cape Colony produce the whole of the quantities imported, but they should compete in the oversea markets with dried fruits from other countries.

Viticulture has retrogressed so far as the quantity of the produce is concerned, but has advanced in respect of quality. The outlet for this industry to bring about progress as regards quantity as well will have to be looked for in South Africa. The production of wine and brandy in Cape Colony (which is practically the only producer in South Africa) for the years 1907-9 is as follows:—

Year.	Wine (leaguers).	Brandy (leaguers).
1907	46,566	10,673
1908	42,433	9,081
1909	27,302	5,274

The cultivation and curing of tobacco are little understood by farmers in this country, with the exception of a few. According to the latest statistics about 10,000,000 lbs. are produced annually in the four Provinces, but on the whole this tobacco is of poor quality. Nor has a cigar wrapper leaf worthy of the name yet been produced. The Governments of the Transvaal and Cape Colony are giving expert assistance to growers. The depression in the viticultural industry has led to attention being given by wine-farmers in Cape Colony to the growing of Turkish tobacco with a fair amount of success. The market for Turkish tobacco in this country is very limited, and the chances of export oversea are too remote to be seriously considered at the present time. To improve the quality of the Virginian types of tobacco already being raised in this country is the more practical course.

Lastly, there are our sea fisheries. The value of the exports (not including whale products) from Cape Colony and Natal (chiefly to the other Provinces of the Union) during the last three years were:—

From	1907.	1908.	1909.
	£	£	£
Cape Colony ...	83,780	105,225	119,845
Natal ...	25,255	16,360	16,269

The annual value of the fish caught in the waters of the two maritime provinces is not known. The export table shows, however, that the sea fisheries are of large economic value. The consumption in South Africa is probably three times the export value mentioned. Practical questions, such as the methods of fishing in vogue, the spawning seasons and the habits of the different fishes have not received the attention they deserve. The investigation of these matters requires to be undertaken.

The values of the agricultural and pastoral products exported overseas from British South Africa during the three years 1907-1909 are instructive:—

1907.	1908.	1909.
£7,220,104.	£6,549,603.	£8,825,118.

The decrease in 1908 is accounted for almost wholly by the general fall of prices of wool and mohair. The large increase in the 1909 exports over 1907 is to be attributed chiefly to wool, ostrich feathers, hides and maize.

The value of the exports (including inter-provincial trade) of live-stock and agricultural, viticultural, pastoral and fishery products (South Africa), from each of the four Provinces of the Union in 1909 is as follows:—

AGRICULTURAL PRODUCTS—EXPORTS (including inter-provincial trade).

Product.	Cape Colony.	Transvaal.	Orange Free State.	Natal.
	£	£	£	£
Flour ...	89,923	2,809	65,657	1,214
Wheat ...	8,253	786	23,123	1,142
Oats ...	110,385	633	17,278	559
Oathay ...	68,988	...	...	...
Barley ...	3,148	128	1,148	59
Rye ...	496	23	3,069	9
Maize ...	9,424	77,077	559,587	195,197
Kaffir Corn ...	3,339	10,592	36,436	1,069
Sugar ...	...	...	...	758,014
Tea ...	24	...	...	4,512
Fruit ...	159,225	13,839	2,692	108,146
Lucerne ...	17,767	1,053	1,573	4,264
Potatoes ...	42,337	5,911	33,559	37,858
Other vegetables ...	29,694	2,464	6,348	11,410
Tobacco ...	83,242	90,355	4,803	28,528
Samp ...	795	2,498	147	17,730
Oatmeal ...	7,531	5	...	281
Maize Meal and other Meal ...	7,864	8,734	4,309	8,529
Bran ...	26,133	216	21,865	446
Beans and Peas ...	2,681	414	3,767	2,923
Cotton ...	...	845	...	...
Buchu ...	9,666	...	...	...
Fodder and Forage (not specified) ...	22,917	281	19,461	12,691
	703,832	218,663	804,822	1,193,981

LIVESTOCK AND PASTORAL PRODUCTS—EXPORTS (including inter-provincial trade).

Product.	Cape Colony.	Transvaal.	Orange Free State.	Natal.
	£	£	£	£
Animals, living	1,479,098	118,889	837,324	51,391
Meats	5,072	1,365	3,763	212,614
Wool	2,042,979	309,433	989,367	268,344
Mohair	688,949	22,542	86,041	21,833
Ostrich Feathers	2,086,636	4,193	4,530	1,468
Hides and Skins	635,027	135,818	125,395	237,899
Cheese	5,385	135	961	1,243
Milk (Fresh)	315	2,325	22,592	3,432
Butter	12,862	2,536	84,496	42,830
Eggs	38,218	1,601	52,012	1,524
	6,994,541	598,837	2,206,481	842,578

VITICULTURAL PRODUCTS AND RUM—EXPORTS (including inter-provincial trade).

Product.	Cape Colony.	Transvaal.	Orange Free State.	Natal.
	£	£	£	£
Wine	85,713	364	29	1,500
Brandy	66,976	238	131	1,457
Currants and Raisins	8,260	...	...	...
Argol	2,197	...	...	...
Rum	...	...	...	6,724
	163,146	602	160	9,681

FISH AND THEIR PRODUCTS—EXPORTS (including inter-provincial trade).

Product	Cape Colony.	Transvaal.	Orange Free State.	Natal.
	£	£	£	£
Fish (fresh, dried and preserved) ...	119,845	...	...	16,269
Whalebone	400	...	...	...
Whale Oil	15,454	...	...	11,184
	135,699	...	...	27,453
Grand Totals ...	7,997,194	818,102	3,011,463	2,069,181

By improving the productive capacity of the soil, by raising more cereals and fodder crops, by feeding stock and keeping more, by greater attention to animal products, by preventing, curing, eradicating or controlling diseases of stock and of plants, and by extensive research work it should not be beyond the power of South Africa to be not only self-contained, but to add far more largely than it does to the requirements of other countries in food and clothing.

ANIMAL DISEASES—CONTAGIOUS AND INFECTIOUS.

Summary of Outbreaks of Contagious and Infectious Animal Diseases Scheduled under Act No. 27 of 1893.

Still under Quarantine on 30th April, 1910.

DISTRICT.	Anthrax.	African Coast Fever.	Epizootic Lymphangitis.	Glanders.	Lung-sickness.	Redwater.	Scabies (Equines.)	Sponziëkte.	Totals.
Middledrift	1	...	...	...	...	...	...	...	1
Albert	...	...	...	1	...	...	...	...	1
Aliwal North	...	...	...	...	...	...	...	2	2
Barkly East	...	...	...	...	2	...	...	...	2
Barkly West	3	...	...	...	...	...	...	...	3
Bathurst	...	...	...	...	1	...	...	...	1
East London	1	...	...	...	7	...	...	1	9
Fort Beaufort	...	...	...	...	...	2	...	...	2
Herschel	...	...	...	...	...	1	...	1	2
Humansdorp	...	...	1	...	...	...	2	...	3
King William's Town	2	...	...	...	6	...	...	5	13
Komgha	...	...	...	...	3	...	...	...	3
Kuruman	1	...	...	...	2	...	...	...	3
Mafeking	1	...	...	...	...	...	...	2	3
Malmesbury	1	...	...	...	...	...	...	...	1
<i>Tembuland.</i>									
Umtata	...	...	...	...	5	...	...	...	5
Engcobo	...	...	...	...	34	...	...	...	34
Xalanga	1	...	...	...	...	...	...	...	1
St. Mark's	...	...	...	...	7	2	...	...	9
Mqanduli	...	...	...	...	9	...	...	2	11
Elliotdale	...	...	...	...	6	...	...	...	6
<i>Transkei.</i>									
Butterworth	...	...	...	...	2	...	...	4	6
Idutywa	...	...	...	...	11	...	...	...	11
Kentani	1	...	...	...	2	...	...	9	12
Nqamakwe... ..	...	...	...	...	5	...	1	4	10
Port St. John's	...	...	...	...	1	...	...	...	1
Tsomo	...	...	...	...	3	...	...	...	3
Willowvale	...	...	...	...	8	...	...	25	33
<i>Pondoland.</i>									
Libode	...	...	...	...	2	...	...	1	3
Ngqeleni	...	...	...	...	2	...	...	...	2
Lusikisiki	...	...	...	...	7	...	...	1	8
Flagstaff	...	...	...	...	2	...	...	...	2
Tabenkulu	...	...	...	...	4	...	...	...	4
<i>East Griqualand.</i>									
Mount Ayliff	...	...	...	...	1	...	...	...	1
Umzimkulu	...	1	...	...	...	...	1	2	4
Qumbu	...	...	...	...	3	...	...	...	3
Tsolo	...	...	...	...	8	...	...	...	8
Mount Frere	...	...	...	...	3	...	...	...	3
Mount Fletcher	...	...	...	...	...	...	...	1	1
Totals	12	1	1	1	146	5	4	60	230

GEORGE ROWE, for Chief Veterinary Surgeon.

Office of the Chief Veterinary Surgeon,
Cape Town, 1st June, 1910.

FARMERS' CONGRESS, 1910.

Minutes of the proceedings of the Annual Meeting of the Central Association, held at Fort Beaufort, commencing Monday, April 18th, 1910.

Congress assembled in the Parish Hall at 10.30.

The Secretary called the roll, when the following delegates answered to their names: Messrs. W. H. Hockly, T. C. Hall, E. J. T. Pringle (Bedford), Webb (Bathurst East), Geo. H. Hill and Fred. Ford (Bathurst West), J. J. Thomas (Bolotwa), J. A. King, H. de Wilton Smith (Bontebok Flats), J. M. Gush (Central Albany), P. J. J. Coetzee, Jas. Butler (Craddock), H. C. van Zyl, F. Hedger (Colesberg), General Sir E. Y. Brabant, W. Goulden (East London), Jno. G. Laing (Elliot), L. J. Roberts, B. Niland (Fort Beaufort and Alicedale), P. Heyns (George), J. Adams (Kimberley), W. A. Edmonds, J. N. C. Hardwich (Komgha), G. L. Tomlinson, J. N. Malan (Koonap Heights), W. van der Walt (Naauwpoort), A. Welsh, H. Sinclair (Post Retief), J. F. v. G. Bekker (Steynsburg), G. H. Gordon (Stutterheim), A. H. Frost (Tarka), Jno. Bowen, J. Martin (Uitenhage), Chas. Butler (Vryburg), W. Slater (Victoria West), E. H. Berrington (Wodehouse), Hon. R. F. Hurndall, M.L.C., W. E. Rubidge, T. E. Murray (Zwaart Ruggens). Mr. O. E. G. Evans attended as representative of the Agricultural Union.

FORMAL OPENING DEFERRED.

The President (Mr. W. H. Hockly) explained that the Hon. F. S. Malan, Minister for Agriculture, would arrive by this afternoon's train, and would be pleased if the formal opening were deferred pending his arrival. It was decided to defer the formal opening of Congress till the afternoon.

HOURS OF SITTING.

Mr. Hall (Bedford) moved, "That the hours of sitting be from 9 a.m. to 12.45 p.m., from 2.15 p.m. to 6 p.m., and from 8 p.m. daily, subject to engagements." Seconded by Mr. Francis, and agreed to.

AUDIT COMMITTEE.

The Hon. R. F. Hurndall (Zwart Ruggens) moved, "That Messrs. L. J. Roberts and H. Sinclair be auditors." Seconded by Mr. Edmonds, and agreed to.

REVISING COMMITTEE.

Mr. Hall (Bedford) moved, "That one delegate from each branch represented at Congress form the Revising Committee, and that Congress adjourn till 2.30 p.m. to enable the Committee to complete its work." Seconded by Mr. Sinclair, and agreed to.

Congress adjourned at 11.30.

AFTERNOON SITTING.

Congress resumed at 2.30.

The following additional delegates were in attendance: Messrs. E. J. Collett (Midlands), H. Trollip (Cradock), J. J. Vosloo (Somerset East), C. H. Long (Central Albany), G. H. Maasdorp (Albert).

The President having formally declared Congress opened, introduced the Hon. F. S. Malan (Minister for Agriculture), and extended to him a very cordial welcome. The President also introduced Mr. P. J. du Toit (Under Secretary for Agriculture), Dr. Beck (Senator), and Messrs. McKee (Wool Expert), Pillans, jun. (Plant Investigator), and Dixon (Senior Veterinary Assistant), and welcomed them.

WELCOMES.

His Worship the Mayor (Mr. Wilson) and members of the Town Council were in attendance, and extended a warm welcome to the delegates and distinguished visitors to Fort Beaufort.

Mr. Crozier, C.C. and R.M., and members of the Divisional Council were in attendance, and extended a warm welcome on behalf of the district of Fort Beaufort.

Mr. L. J. Roberts, on behalf of Fort Beaufort, Post Retief and Koonap Farmers' Associations, extended a cordial welcome in the name of that body.

On behalf of the Reception Committee, Mr. Roberts made the following invitations: To tea in the Grove on Tuesday afternoon; to luncheon, on Wednesday, at 1 p.m., to a drive to Baddafort, start at 2.30 p.m. the same afternoon; and to a theatrical performance by the local Dramatic Amateurs, besides invitations from the Tennis, Croquet, and Golf Clubs.

The President acknowledged the whole of the welcomes, returning thanks on behalf of Congress for the good wishes expressed, and hoping the present Congress would be the best in its long life.

MINISTER FOR AGRICULTURE.

The Hon. F. S. Malan (Minister for Agriculture) then delivered a lengthy address, indicating what had been done by the Department. The Minister's address was listened to intently, and frequently interrupted by applause.

The President then called upon Dr. Beck (Senator of the Union Parliament) to address Congress.

Sundry questions were asked, and answered by the Minister for Agriculture.

EAST COAST FEVER.

Mr. Hall (Bedford) moved: "In view of the immense issues involved, and the reports of fresh outbreaks of East Coast Fever in Natal, and in the Native Territories, this Congress urgently urges Government to spare no expense in safeguarding the Colony from its inroad. And this Congress places on record its thanks to Government for action already taken." Seconded by General Sir E. Y. Brabant, and agreed to.

Mr. A. Welsh (Post Retief) asked leave to move an unopposed motion in connection with the above, and leave being granted, moved: "That this Congress desires to place on record its appreciation of the services rendered by the C.M.R. in guarding the borders of this Colony from East Coast Fever, and trusts that their efforts will be crowned by success; and that a copy of the resolution be forwarded to the Officer Commanding the C.M.R." Seconded by Mr. Rubidge, and agreed to.

CATTLE CLEANSING ACT TO BE COMPULSORY.

Mr. E. J. T. Pringle (Bedford) moved: "The efficacy of dipping cattle for the destruction of ticks having been proved, Congress is of opinion that the Cattle Cleansing Act should be made compulsory throughout the tick area." Seconded by Mr. Bowen.

The motion was under debate when Congress adjourned at 6 p.m.

EVENING SITTING.

Congress resumed at 8 p.m.

The following additional delegates were in attendance: D. Munro (Victoria East), F. Burgers (Cove Rock), C. Kuhn (Frankfort), A. C. Tainton and H. P. Warren (King William's Town).

Congress accepted the invitations received this morning, as follows: Tea in Grove on Tuesday afternoon; luncheon at 1 p.m. on Wednesday; dramatic entertainment on Wednesday evening at 8 o'clock; visit to Badford on Thursday afternoon at 2.30 p.m.

CATTLE CLEANSING ACT TO BE COMPULSORY.

The debate on this subject was resumed.

On a vote being taken, the motion was agreed to.

AMENDING THE CATTLE CLEANSING ACT.

General Sir E. Y. Brabant (East London) moved: "This Association is of opinion that the Government should amend the Cattle Cleansing Act, so that all stock infested by ticks be cleansed on farms as well as on public roads; and that Government be requested to have an investigation made with a view of ascertaining what dip is the most efficacious in destroying ticks, whilst doing least possible damage to the animal dipped." Seconded by Mr. Martin, and agreed to unanimously.

JOINTED CACTUS.

Mr. E. J. T. Pringle (Bedford) moved: "While admitting the excellent work being done in certain districts in eradicating the Jointed Cactus, Congress again strongly urges the necessity of compulsory legislation for its complete eradication, as the facility with which it spreads renders it the most serious menace to the country." Seconded by Mr. Hall.

Mr. T. E. Murray (Zwaart Ruggens) moved as an amendment to add: "And that the cost of such eradication be borne in the following proportion, viz., the owner of the farm one half, the Divisional Council one fourth, and the Government one fourth."

Mr. A. Welsh (Post Retief) moved, as a further amendment, to omit the words "of compulsory legislation."

Mr. Rubidge (Zwaart Ruggens) moved, as an amendment to Mr. Murray's rider, "That the expense be borne equally by the owner, the Divisional Councils, and the Government."

Mr. Jas. Butler (Cradock) moved, on the suggestion of the Minister, "That the matter be referred to a Committee for report, Committee to consist of five members." Seconded by Mr. Francis

On a vote being taken, this was agreed to.

Mr. Butler moved: "That the Committee be Messrs. Hall, Evans, Goulden, Murray and Hurndall." On a vote being taken, this was agreed to.

Mr. Hurndall (Zwaart Ruggens) moved the adjournment. Seconded by Mr. Francis, and agreed to.
Congress adjourned at 10.30 p.m.

TUESDAY, APRIL 19TH.

Congress resumed at 9.30.

The Secretary called the roll, when the following answered to their names: Messrs. G. H. Maasdorp (Albert), W. H. Hockly, T. C. Hall, E. J. T. Pringle (Bedford), Webb (Bathurst East), G. H. Hill and Fred. Ford (Bathurst West), J. J. Thomas (Bolotwa), J. A. King, H. de Wilton Smith (Bontebok Flats), J. M. Gush, C. H. Long (Central Albany), J. J. Coetzee, H. Trollip, Jas. Butler (Cradock), H. C. van Zyl (Colesberg), F. Burgers (Cove Rock), Sir E. Y. Brabant, W. Goulden, sen. (East London), Jno. G. Laing (Elliot), C. Kuhn (Frankfort), L. J. Roberts, B. J. Niland (Fort Beaufort and Adelaide), Pet. Heynes (George), J. Adams (Kimberley), H. P. Warren, A. C. M. Tainton (King William's Town), W. A. Edmonds, J. N. C. Hardwich (Komgha), G. L. Tomlinson, J. N. Malan (Koonap Heights), A. Francis (Molteno), R. H. Struben, E. J. Collett (Midlands), W. v. d. Walt (Naauwpoort), A. Welsh, H. Sinclair (Post Retief), J. J. Vosloo (Somerset East), Jno. Bekker (Steynsburg), G. H. Gordon (Stutterheim), A. H. Frost (Tarka), Jno. Bowen, Jno. Martin (Uitenhage), H. H. Hards (Upper Albany), Chas. Butler (Vryburg), D. Munro, W. Slater (Victoria East), E. H. Berrington (Wodehouse), Hon. R. F. Hurndall, M.L.C., W. Rubidge, T. E. Murray (Zwaart Ruggens); O. E. G. Evans, representing the Agricultural Union.

Minutes read and confirmed.

The Secretary read telegrams as follows: From the Director of Irrigation, regretting inability to attend: from the Belmont Branch, stating that Mr. Lourens, their delegate is detained: from the Alexandria and Lower Cathcart Branches, regretting inability of delegates to attend: from "Veterinus," stating that Mr. Dixon was attending; and from Mr. Haarhoff, wishing Congress success.

PRESIDENT'S ADDRESS.

The President (Mr. W. H. Hockly) read his address as follows:—

I have very much pleasure in welcoming you to this Congress. It is now 27 years since we last met in Fort Beaufort, and that meeting was one of the most important that has been held. The "Central" then took definite form, and has continued to hold annual meetings with the exception of the years when the country was in too unsettled a condition owing to the war.

You will have submitted to you certain resolutions passed at our last Congress, and also proposals agreed to at a special meeting held at Bedford in August last, attended by representatives of the four existing organisations.

To all who sincerely hope for a closer union of the several organisations these resolutions must have been welcome. The result was, I think, more than even the most sanguine expected. Every subject was fully discussed, and then a motion was submitted meeting as far as possible the views expressed by the delegates present. Each motion was then submitted to the vote, and carried unanimously. A draft constitution was then drawn up on the lines of the resolutions agreed to. This was submitted clause by clause, and we have the satisfaction of seeing that these also were carried through without a dissentient vote. The matter was then referred to the Agricultural Union, and some slight amendments were proposed. There you will have to consider together I hope with delegates representing the Agricultural Union and Horticultural Boards, who have been specially invited to be present and take part in considering the whole subject.

I feel convinced that if the matter is approached with a sincere desire to bring about a satisfactory solution, it can and will be accomplished. We do not claim that the decision arrived at is perfect in any respect, but it ought to open the way to make a

defined and workable basis. No doubt in the course of time and with further experience defects will be found, but these can be dealt with as they arise. Should this measure go through, Fort Beaufort will have the honour of having passed here the second step to advance and consolidate the organisations working in the common interest of Agriculture.

At this stage it may not be out of place to take a review of the work undertaken or accomplished by the different Agricultural organisations. There are those who ask the question, what have you done, do results justify our existence? To those who will take a careful review of matters considered at farmers meetings, and what action the Government and Parliament have taken thereon, will I think have to admit that a very large proportion of resolutions and Acts of Parliament dealing with Agriculture have been initiated at farmers meetings and submitted by them to Government for consideration. For years past Government has encouraged these associations to submit their proposals to them for consideration.

The present Minister for Agriculture has shown much interest in our meetings, and has justified us in believing that he will do all in his power to establish a proper understanding between the head of his Department and the farmers' representatives.

At our last meeting I congratulated you on the brighter prospects which seemed than to be before us, and am thankful to say that wish has been realised. We have had good rains in most parts of the Colony.

Our principal exports—feathers, wool and mohair have increased satisfactorily, and generally there is a hopeful feeling in the minds of most.

A considerable advance has been made in the treatment of our wools—it now being recognised that to get anything like the true value, wool must be put on to the market in the best possible condition. The difference in the price between well and badly got up clips is now so marked that every farmer must see that it is to his own interest to get up his clip in the best possible manner.

It is very gratifying to find that land owners are seeing the necessity for utilising our storm and flood waters. Pumping plants are being erected in many places and land brought under cultivation which was considered impracticable before. Along most of our rivers weirs are being constructed to divert water which has hitherto been lost. A large extent of the best land in the country will thus be brought under irrigation, and must add largely to the prosperity of the Colony.

Our agenda will receive your careful consideration. I hope this meeting will be a pleasant and profitable one.

Mr. Sinclair (Post Retief) moved the adoption of the address. Seconded by Mr. Heynes, and agreed to.

SECRETARY'S REPORT.

The Secretary's report was as follows:—

Mr. President and Gentlemen.—I have the honour to submit my report, which may conveniently be divided into the sections, viz. action taken on resolutions, and routine. In accordance with the desire of Congress, I endeavoured to arrange a meeting with the Minister for Agriculture and other Ministers at a convenient date; but after considerable correspondence, when the 18th of July was decided upon, none of our Executive were able to go to Cape Town. It devolved on me, therefore, to do the best I could under the circumstances, though my enthusiasm was damped by the statement of Ministers that no funds were available. It was also extremely unfortunate that several of the Ministers were away in London, on Union business, and Acting Ministers, while expressing sympathy, could only promise to bring the matter under discussion to the notice to the Ministers on their return. I append briefly the replies to the several motions submitted:—

ACTION TAKEN ON RESOLUTIONS.

Resignation of Mr. Noble Jack and the appointment of an Expert as Director of Agriculture.—The Minister replied that in view of Union the Government does not intend to appoint a Director of Agriculture at present.

Divisional Councils and Noxious Weeds.—Reply: The Government has power to sue Divisional Councils for neglect to eradicate noxious weeds, and under Union regulations will be made applying to the whole country by the Union Parliament.

Compulsory Eradication of Jointed Cactus.—Legislation promised. Either an Act or an amending clause to the present law would be introduced, as Government recognises the full importance of dealing with this matter.

Eradication of Noxious Weeds on Government and Divisional Council Properties.—This is being done, and the Police have to report Noxious Weeds.

Noxious Weeds in Native Territories.—The matter has had and is having attention. Stringent regulations have been issued for the eradication of Noxious Weeds.

More Police.—The Acting Attorney-General said he would bring the matter to Mr. Burton's notice. A senior officer was making a tour of enquiry. The Government was very sympathetic.

Charcoal for Pumping Plants.—Minister fears this may denude the country of trees.

Well-sinking in Bechuanaaland.—The Law of 1908 permits prospecting for water.

Police Expenses.—Actual disbursements when on escort or prosecution duty are refunded.

Heavier Punishment for Stock Thefts.—The Acting Minister said he would refer this to the Attorney-General.

Natives holding Land among Europeans.—To be referred to the Premier on his return.

Sponziekte.—The Minister promised to draw the attention of the Veterinary Department to the matter.

Lamziekte.—A sum of £700 had been placed aside for investigating this disease.

Salt Wort.—The Minister promised to deal with this matter.

Location Act.—The Secretary for the Native Department stated that Government intended to introduce the Bill recommended by Congress, and he thought the suggestion to omit "native servants" would also be adopted.

Jackal Fencing.—The Minister was very sympathetic, but thought the time was not ripe for such legislation.

The Scab Act.—The Minister said the Government recognises the weak points in the existing Acts. He had codified the Acts, and had drafted the Bill, but as that was the last Session of the present Parliament, he was not going to submit it. (I may state that I pressed the views of Congress very strongly, and a somewhat warm discussion took place, in which the Under Secretary for Agriculture participated.)

Cattle Cleansing Act.—Minister very sympathetic, and thought the suggestions of Congress were good points, and these would have his consideration. He was taking steps giving the Divisional Councils power to construct dipping tanks.

East Coast Fever.—Here again the Minister was sincerely sympathetic, and said that the suggestion of Congress had practically been adopted.

Expert for Ostrich Diseases.—The Government will cause investigations to be made, if farmers will provide the birds.

Agricultural College for the East.—Government is preparing a scheme, and the Minister would visit the places which had been suggested.

Liquor in Prohibited Areas.—The Acting Minister promised to bring the matter before the Attorney-General.

Protection of Springs.—The Government is doing what it can in this matter.

Farming Education.—As a commencement the "Agricultural Reader" had been prepared under the auspices of the Department for use in schools. This was a beginning.

Removal of Stock to O.R.C.—The Minister had approached the O.R.C. Government, but without avail.

Nuisances in Rural Areas.—To be brought to the notice of the Attorney-General.

Income Tax.—This matter was being attended to.

Tax on Greyhounds.—Government was watching the effect of the present law closely, and would strengthen the Act if found necessary.

Retrenchment of Experts.—The Government's intention was rather to extend than to retrench the experts.

Indigenous Grasses.—The appointment of an officer was received with favour, but the Minister said we must train our own men for it.

Tree Planting.—The Government was spending more money this year, and extending field of operations. In the course of his remarks the Minister expressed surprise that fodder bushes or trees, such as the Spekboom, were not specially grown by farmers, as it was so easily propagated by slips.

Compulsory destruction of Locusts.—The time was not ripe for compulsion, but £3,000 had been placed on the Estimates for assisting the destruction of locusts.

Protection of Bees.—Sympathetic, and stated that no foreign bees can be imported.

Estimate of Maize Production.—This is being left for the Union Government to deal with.

CO-OPERATION WITH OTHER ORGANISATIONS.

In accordance with the resolutions adopted at last Congress, negotiations were opened with other organisations for a Conference of delegates to meet at Bedford, to again consider the question of co-operation. It was eventually decided that the meeting should take place on the 16th August; and on that day the several representatives met in the Bedford Club, as follows:—

Central Association.—Mr. W. H. Hockly, Sir E. Y. Brabant, Messrs. D. J. Haarhoff, R. H. Struben, and T. C. Hall.

Agricultural Union.—Messrs. C. G. Lee, Tom T. Hoole, O. E. G. Evans, and P. W. Michau, M.L.A.

W.P. Board of Horticulture.—Mr. A. A. Persse.

E.P. Board of Horticulture.—Messrs. W. B. R. Goulden, W. A. Robinson, Jno. Landrey, jun., and H. M. Sheard.

Mr. Hockly was elected Chairman of the Conference; and Mr. Hall, Secretary.

The sitting lasted until late in the afternoon of the second day, when the following report was unanimously adopted and signed by every representative present:—

Whereas it is desirable to establish an organisation by which the Agricultural interests shall secure the attention which its importance demands, to attain this object it is hereby agreed that a Board of Agriculture be formed.

CONSTITUTION.

1. That the Board of Agriculture of the Cape of Good Hope shall consist of members from the Executives for the time being of the existing Agricultural organisations (viz., the Central Association, the Agricultural Union, W.P. Board of Horticulture, and E.P. Board of Horticulture), as hereinbefore provided, who shall act as the medium between the several Agricultural organisations and (a) the Provincial Government, and (b) the Union Government, in respect of all matters decided upon by the various Congresses.

2. Representation of the several units on the Board of Agriculture shall be as follows: The Executive of the Central Association shall appoint four members, the Executive of the Agricultural Union four members, and the Executives of the Western Province and Eastern Province Boards of Horticulture each two members; and that Government have the right to send representatives from its technical staff to assist the Board of Agriculture in its deliberations.

3. That the Board of Agriculture is hereby authorised to act as an Advisory Board to the Government; and has full power to represent the several units, the Board's decisions being binding.

4. That each unit represented on the Board of Agriculture shall carry the number of votes to which it is entitled, as provided in Clause 2, irrespective of the number of its representatives actually present at any meeting of the said Board, provided that no member of the Board may represent more than one unit.

5. That the Board of Agriculture shall elect each year a Chairman and Vice-chairman from among its own members, who shall have both a deliberate and a casting vote when presiding at meetings.

6. In the event of the Chairman or Vice-chairman being absent from any meeting of the said Board, a Chairman shall be chosen from among the members present.

7. That the Secretary, Treasurer, and Auditors may be appointed by the said Board.

8. The Board of Agriculture shall at its first meeting fix the number which constitutes a quorum.

9. That the Board of Agriculture shall from time to time send reports of their meetings to the several units, and in any case must report at least annually, which annual report shall contain an audited financial statement.

10. That any funds at the disposal of the Board of Agriculture shall be vested in the hands of the Chairman and Treasurer for the time being of the said Board, who are authorised to receive and disburse the funds of the Board.

11. In the event of any amendment to this constitution being deemed advisable, printed copies of such amendments shall be forwarded to the several units for their consideration and acceptance or otherwise three months before the annual meeting of such units; failing acceptance by all the units, it shall not be effective unless agreed to by at least two-thirds of the members of the Board of Agriculture at their first meeting thereafter.

12. That the Board of Agriculture shall co-operate with organisations in other Provinces in South Africa having similar objects.

Signed at Bedford, this 17th day of August, A.D. 1909.

The report was printed, and a supply sent to each of the organisations respectively, accompanied by the following letter which had been drafted and approved of by the Conference above referred to :—

Sir,—Herewith you will receive copies of the draft Constitution of the proposed Board of Agriculture, which was agreed to by the delegates representing the several Agricultural organisations of this Colony, at a Conference held at Bedford, on the 16th August and following day.

You are requested to send copies to your several Branches, with an earnest request that the same may be considered and instructions given to their delegates to vote on the matter at the annual Congress of your organisation.

Should any amendments be suggested at such Congress, these must be referred to a second Conference of the gentlemen who have subscribed their names to the draft, which second Conference it is earnestly hoped will not be necessary.—Yours faithfully,

THOS. C. HALL.

Copies of the report were sent to each Branch of the Central Association, together with a copy of the above letter, so that the matter will be considered at this Congress.

The Minister for Agriculture was warmly interested in the Conference, and copies of the report were sent to him and the Under Secretary.

The Minister sent the following letter, being a copy of one sent to the Agricultural Union :—

Sir,—I am directed to acknowledge receipt of your letter of the 28th instant, enclosing copies of the draft constitution of the proposed Board of Agriculture of the Cape of Good Hope, the establishment of which was recommended at a Conference of representatives of the various agricultural organisations of this Colony.

In reply to your request for an expression of the Secretary for Agriculture's opinion of the proposed scheme, I am to say that it is observed that the organisations propose to be federated, and not unified, as was hoped for. Mr. Malan is gratified that a workable agreement has been arrived at by the delegates. In his opinion amendments on the lines shown below would be advisable :—

1. After Agricultural organisations in Clause (1), line 12, the words "of this Colony" might be added, and for "Union Government" the words "Inter-Colonial Agricultural Union" might be substituted, as it seems desirable that matters affecting the Union of South Africa should be submitted to the Inter-Colonial Agricultural Union before being brought before the Union Government.

2. It is noticed that the draft constitution is silent as to the relation of the proposed Board of Agriculture to the Inter-Colonial Agricultural Union. Will the Cape Agricultural Union continue to be alone affiliated to the Inter-Colonial Union? It is not desirable that all the Agricultural organisations of the Cape should be so affiliated, and that they should be represented on the latter Union by means of the proposed Board of Agriculture.

3. The draft Constitution does not say how the proposed Board of Agriculture is to become possessed of funds. Assuming that these will be supplied by the present organisations (or at any rate in part), it is possible that since these organisations remain independent units, they may individually decide to contribute to the funds of the Board in different proportions, or one or other may decide not to contribute at all, while each of the three organisations would continue to exercise the same voting powers. It seems to Mr. Malan that federation as proposed in the draft Constitution should be recognised and secured by regulated contributions to the funds of the Board of Agriculture.

4. It is conceivable, if not probable, that one organisation only may pass a resolution on a particular subject affecting the work of another organisation, which resolution, before being submitted to the Government, would under the draft Constitution be brought before the Board of Agriculture for its consideration; but the representatives of such other organisation might not be able to discuss the matter, through having no mandate from their own organisation, or not knowing the feelings of their organisation on the subject; the members representing the latter body would, therefore, probably feel themselves unable to discuss the subject until it has been referred to their Association.

In conclusion, I am to say that this Department, having intimate knowledge of the manner in which resolutions of the agricultural organisations affect its work, is glad to have been afforded an opportunity of expressing its opinion on the draft Constitution, especially as it was not invited to send a representative to the Conference.

The following memorandum from the Under Secretary for Agriculture states the present position, and may be taken as summarising correspondence :—

A draft Constitution was signed in August at a Conference at which the Farmers' Central Association, the Agricultural Union, the Western Province Horticultural Board, and the Eastern Province Horticultural Board were duly represented. The Agricultural Union and the Western Province Board of Horticulture, at a joint Conference held in September, accepted the Constitution, provided that the Executives of the two bodies be given full power to deal with the question and take such action as may seem to them advisable. Thereupon the joint Executives resolved to propose certain amendments. These amendments were brought to the notice of the Eastern Province Horticultural Board and the Farmers' Central Association. The former considered the Constitution and the proposed amendments at their quarterly meeting in December, but the Central Association cannot, under its constitution, consider the matter except at the next Congress, which is proposed to be held in the beginning of April. The following is the present position in detail :—

Clause 1.—The Minister of Agriculture proposed that after the words "Agricultural organisations," in line 12, the words "of this Colony" be added, and that the words "Inter-Colonial Agricultural Union" be substituted for the words "Union Government."

These amendments have been accepted by the Agricultural Union and both the Boards of Horticulture.

Clause 2.—The Union and the W.P. Board are in favour of altering the representation as follows : The Central Association and the Union each to have five representatives, the W.P. Board three, and the E.P. Board two. The E.P. Board is opposed to any alteration, and wishes the representation to stand at 4, 4, 2 and 2, respectively.

Clause 3.—Has been approved of by the Union and the two Boards.

Clause 4.—Is concurred in by the same three bodies, but as regards the manner in which resolutions by the Union should be brought before the proposed Board of Agriculture, reference to which was made by the Minister of Agriculture, the E.P. Board has resolved to recommend that bye-laws should be drafted by the Board of Agriculture regulating the procedure.

Clauses 5, 6, 7, 8, and 9.—Have been agreed to by the Union and the two Boards.

Clause 10.—Has been agreed to by these three bodies; but the Union and the W.P. Board are in favour of adding thereto "that all units represented on this Board shall contribute to the funds in proportion to their representation on that Board, the amount of such contribution to be settled hereafter." On the other hand, the E.P. Board is of opinion that the Government should earnestly consider the financing of the Board of Agriculture, seeing that the work of the Agricultural Department will be greatly simplified and concentrated by the creation of the Board of Agriculture, and further, that in the event of further funds being required by the proposed Board, the several units contribute in proportion to their representation on the Board.

These three bodies are therefore in agreement, except that the E.P. Board requests the Government to consider whether it will not supply the whole of the funds required.

Clauses 11 and 12.—Are concurred in by the Union and the two Boards.

The Joint Executive of the Union and the W.P. Board has passed a resolution that an effort should be made at the earliest opportunity to have the proposed Board of Agriculture incorporated by Act of Parliament. On this no expression of opinion has been given by the E.P. Board. The Union and the two Boards have asked the Under Secretary for Agriculture to act as Executive Officer in this matter, and take steps for the bringing into existence of the Board of Agriculture at as early a date as possible.

The questions to be decided are :

1. Whether the Union, the Farmers' Central Association, and the W.P. Board accept the proposals of the E.P. Board in regard to Clauses 4 and 10.

2. Whether the Union and the W.P. Board are prepared to withdraw their proposal as regards amending the representation on the proposed Board of Agriculture.

The views of the Union and the W.P. Boards are required on the above two questions in good time before the Farmers' Central Association meets in Congress in the beginning of April, as it seems desirable that a final decision be come to at that Congress.

On the suggestion of the Under Secretary for Agriculture, in connection with the above, and in the hope that finality may be reached as far as the constitution is concerned, representatives of the Agricultural Union, Western Province Board of Horticulture, and Eastern Province Board of Horticulture will meet our representatives on the 22nd inst. to consider the amendments proposed; and, if necessary, the matter can be again submitted to our Congress the same or the following day.

ROUTINE.

A marked copy of the printed minutes was sent to each member of the Ministry, and a copy to each member of Parliament.

Copies were also sent to the Branches in accordance with their membership.

I received a letter, suggesting that the annual meeting of the Central Association might be held at Cape Town at the same time as that of the Union. The matter was referred to the Executive, and the general consensus of opinion was that, as Congress had decided on Fort Beaufort, it was not possible to change the venue. A reply was sent accordingly.

Congress.—At time of writing, thirty-seven branches have notified their intention of being represented, and sixty-three delegates have been elected. Cordial invitations were sent to the Minister for Agriculture and the Under Secretary to attend our meeting, and both have accepted. In addition, I invited the Agricultural Union to send two representatives, and Messrs. Michau, M.L.C., and O. Evans have been selected to attend.

The Hon. F. S. Malan will arrive on Monday afternoon, and he will be pleased if the formal opening of our meeting can be postponed till he is present.

Government Experts.—The following experts of the Agricultural Department will be present at this meeting: Mr. Lounsbury (Entomologist), Mr. Davison (Chief Inspector of Sheep), Mr. Dixon (Senior Assistant Veterinary Surgeon), and Mr. Pillans, jun. (Plant Investigator).

Branches.—Since our last meeting three branches have been added to our roll, viz., Cove Rock, Frankfort, and Potfontein. Of branches which have ceased working, two have been resuscitated, viz., Bolo and Queenstown. I have been unable to elicit replies from the following: Gamtoos River, Hay, Oudtshoorn, Stockenstrom, Steytleville, Venterstad, and Willowmore, possibly owing, in some instances, to change of secretaries, whose names have not been sent to me, though some of these branches may have become defunct.

I have to thank the Fort Beaufort Reception Committee for assistance ungrudgingly given, and also for securing the room wherein our meeting is held. There was a tendency to overwhelm us with hospitality, but happily the programme has been modified, and it is now proposed to invite us to tea in the Grove, to luncheon, theatricals, and a visit to Badaford, the model farm of Mr. L. J. Roberts.

Through the courtesy of the Editor, the minutes of our last annual meeting appeared in the *Agricultural Journal*, and reprints of the reports (English and Dutch) were obtained in pamphlet form, thus effecting a considerable saving. Our thanks are due to the Editor for the interest he has shown in this matter.

If, as I hope will be the case, the proposed Board of Agriculture becomes an actuality, there will be no need for the Executive to proceed to Cape Town specially to lay the decisions of Congress before Ministers, as these will then be sent direct to the Board of Agriculture, which will be the intermediary between Congress and the Government.

It will be seen from the agenda that invitations have been issued for next year's Congress to be held at Vryburg and George.

The local photographer asks whether Congress will have a group photograph taken.

THOS. C. HALL,
Secretary.

Mr. Francis (Molteno) moved, "That the report be taken as read, and adopted." Seconded by Sir E. Y. Brabant, and agreed to.

REPORT ON CLOSER UNION OF AGRICULTURAL ORGANISATIONS.

The President brought forward the Report of the Conference on Agricultural Organisation, held at Bedford, and stated that the report was open for discussion.

The Hon. F. S. Malan (Minister for Agriculture) addressed Congress on the report, expressing a hope that finality would be reached at this Congress.

Mr. Du Toit (Under Secretary for Agriculture) also addressed Congress, outlining the duties of the proposed Board of Agriculture.

Mr. Struben (Midlands) moved: "That the clauses of the report be considered *seriatim*, together with the amendments suggested by the Agricultural Union and the Western Province Horticultural Board, as well as the letter of the Minister for Agriculture." Seconded by Mr. Hall.

Mr. Hards (Upper Albany) moved, as an amendment: "That Congress adopts the Constitution agreed upon by the Conference at Bedford, as printed, with the amendments Nos. 1, 3, 4, and 6, as proposed by the Agricultural Union and Western Province Horticultural Board."

After discussion, the amendment was withdrawn, with the leave of Congress: and on a vote being taken, the motion was agreed to.

Mr. Struben (Midlands) moved the adoption of Clause 1, together with the amendment suggested by the Minister for Agriculture. Seconded by Mr. Hall, and agreed to, reading as follows: "1. That the Board of Agriculture of the Cape of Good Hope shall consist of members from the Executives for the time being of the existing Agricultural Organisations of this Colony (viz., the Central Association, the Agricultural Union, Western Province Board of Horticulture, and Eastern Province Board of Horticulture), as herein provided, who shall act as the medium between the several Agricultural Organisations and (a) the Provincial Government, and (b) the International Agricultural Union, in respect of all matters decided upon by the various Congresses."

Mr. Hall (Bedford) moved the adoption of clause 2, as follows:—

"2. Representation of the several units on the Board of Agriculture shall be as follows: The Executive of the Central Association shall appoint four members, the Executive of the Agricultural Union four members, and the Executives of the Western Province and Eastern Province Boards of Horticulture each two members: and that Government have the right to send representatives from its technical staff to assist the Board of Agriculture in its deliberations."

Seconded by General Sir E. Y. Brabant.

Mr. Hurndall, M.L.C. (Zwaart Ruggens) moved, as a rider: "The said Board shall be constituted annually."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

Mr. Hall (Bedford) proposed the adoption of clause 3. Seconded by Mr. Martin, and agreed to:

"3. That the Board of Agriculture is hereby authorised to act as an Advisory Board to the Government, and has full power to represent the several units, the Board's decisions being binding."

Mr. Hall (Bedford) proposed the adoption of clause 4: "That each unit represented on the Board of Agriculture shall carry the number of votes to which it is entitled, as provided in clause 2, irrespective of the number of its representatives actually present at any meeting of the said Board, provided that no member of the Board may represent more than one unit"

Seconded by Mr. Welsh. Agreed to.

Mr. Hall (Bedford) proposed the adoption of clause 5: "That the Board of Agriculture shall elect each year a Chairman and Vice-chairman from among its own members, who shall have both a deliberative and a casting vote when presiding at meetings."

Seconded by Mr. Sinclair. Agreed to.

Mr. Hall (Bedford) proposed the adoption of clause 6: "In the event of the Chairman and Vice-chairman being absent from any meeting of the said Board, a Chairman shall be chosen from among the members present."

Seconded by Mr. Rubidge. Agreed to.

Mr. Hall (Bedford) proposed the adoption of clause 7: "That the Secretary, Treasurer, and Auditors may be appointed by the said Board."

Seconded by Mr. Hards. Agreed to.

Mr. Hurndall, M.L.C. (Zwaart Ruggens), moved, as an amendment, "to omit the word 'may' and insert 'shall.'"

On a vote being taken, the amendment was agreed to, and the motion as amended agreed to.

Mr. Tainton (King William's Town) moved the adoption of clause 8, as follows: "The Board of Agriculture shall, at its first meeting, fix the number which constitutes a quorum."

Seconded by Mr. Hall.

Mr. Struben (Midlands) moved as a rider: "And shall draft bye-laws to regulate its procedure."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

Mr. Hall moved the adoption of clause 9. Seconded by Mr. Ford: "That the Board of Agriculture shall from time to time send reports of their meetings to the several units, and in any case must report at least annually, which annual report shall contain an audited financial statement." Agreed to.

Mr. Hall moved the adoption of clause 10, as follows: "That any funds at the disposal of the Board of Agriculture shall be vested in the hands of the Chairman and Treasurer for the time being of the said Board, who are authorised to receive and disburse the funds of the Board, and that all units represented on the Board shall contribute to the funds in proportion to their representation on the Board, the amount of such contribution to be settled hereafter."

Seconded by Mr. Struben, and agreed to.

Mr. Hall moved the adoption of clause 11, as follows: "In the event of any amendment to this Constitution being deemed advisable, printed copies of such amendments shall be forwarded to the several units for their consideration and acceptance or otherwise three months before the annual meeting of such units; failing acceptance by all units, it shall not be effective unless agreed to by at least two-thirds of the members of the Board of Agriculture at their first meeting thereafter."

Seconded by Mr. Struben, and agreed to.

Mr. Bekker (Steynsburg) moved, as a further clause: "In the case of a vacancy on the Board of Agriculture, caused by resignation or otherwise, the Executive who appointed the member shall appoint a successor to fill the vacancy."

Seconded by Mr. Rubidge, and agreed to.

Mr. Hall moved the adoption of clause 12, as follows: "That the Board of Agriculture shall co-operate with organisations in other Provinces in South Africa having similar objects."

Seconded by Mr. Hurndall, and agreed to.

Mr. Struben (Midlands) moved: "That an effort should be made at the earliest opportunity to have the proposed Board of Agriculture incorporated by Act of Parliament."

Seconded by Mr. Collett, and agreed to.

Mr. Hall moved: "That the Under Secretary be requested to act as an Executive Officer in this matter, receive correspondence, etc., and take steps to get the Board of Agriculture into working order at as early a date as possible." Seconded by Mr. Rubidge and agreed to.

Mr. Roberts (Fort Beaufort and Adelaide) moved: "That the Conference representatives at Friday's meeting have full power to act." Seconded by Mr. Edmonds, and agreed to.

Mr. Adams moved: "That a member be appointed in place of Mr. Haarhoff, who is absent." Seconded by Mr. Murray, and negatived.

NOXIOUS WEEDS.

Resolved that all motions dealing with noxious weeds stand over until the Jointed Cactus Committee's report is received.

STOCK DISEASES.

Mr. Bekker (Steynsburg) moved, as an unopposed motion, "that motions dealing with stock diseases be now taken." An objection being raised, the matter dropped.

MORE POLICE WANTED.

Mr. A. Welsh (Post Retief) moved: "Whereas stock thefts are extremely prevalent, and in certain areas are increasingly frequent, Congress strongly urges the necessity for strengthening the Police force, so as to afford farmers adequate protection, more especially in those areas more subject to this crime." Seconded by Mr. Berrington.

Mr. Maasdorp (Albert) moved, as an amendment, "and that the Cape Police be restored to all districts in place of the District Police." Congress adjourned at 12.45.

AFTERNOON SITTING.

Congress resumed at 2.15.

MORE POLICE WANTED.

On the resumption of the debate on this matter, Mr. Welsh asked that the question may stand over pending the arrival of Major Elliott.

Mr. Hall moved: "That all police and stock theft questions stand over." Seconded by Mr. Rubidge, and agreed to.

NATIVE LABOUR SHELTERS.

Mr. Frost (Tarka) moved: "That the Labour Department of the Colony be approached to provide shelter for natives travelling in search of labour, or returning from same to Kafirland, on any Government property available along the principal routes." Seconded by Mr. Martin, and negatived.

PASS LAW FOR NATIVES.

Mr. Maasdorp (Albert) moved: "That Congress is of opinion that it is desirable that a Certificate Pass Law for Natives be put in force." Seconded by Mr. Hall (for Belmont) for discussion. The motion was agreed to.

KAFIR BEER DRINKS.

Mr. Bowen (Uitenhage) moved: "That this Congress most strongly condemns the practice of some farmers who allow Natives to congregate on their farms for the purpose of beer drinking, and recommends that it be made illegal for farmers to allow beer drinks on their farms unless they give 48 hours' notice to the officer in charge of the nearest police station before allowing a beer drink to take place." Seconded by Mr. Berrington.

Mr. Rubidge (Zwaart Ruggens) moved as an amendment to omit the words "48 hours" and insert "three days."

Mr. W. A. Edmonds (Komgha) moved, as a further amendment: "This Congress most strongly disapproves of the practice of some farmers in allowing strange Natives to congregate on their farms for the purpose of beer drinking, and that it be made illegal for farmers to allow others than their own servants to have beer drinks on their farms; also that 48 hours' notice of any beer drink must be given to the Police."

On a vote being taken, Mr. Rubidge's amendment was agreed to, and the amendment as amended was agreed to.

THANKS TO THE HON. F. S. MALAN.

The President notified that the Minister for Agriculture was leaving.

The Hon. R. F. Hurndall, M.L.C. (Zwaart Ruggens) moved: "That a hearty vote of thanks be accorded to the Hon. F. S. Malan." Seconded by General Sir E. Y. Brabant, and agreed to with musical honours, members standing.

The Hon. F. S. Malan, Minister for Agriculture, feelingly responded.

It was also decided to accord a vote of thanks to Senator Dr. Beck, who also responded.

NO KAFIR BEER.

Mr. Hall (for Alexandria) moved: "That the existing laws should be so amended as to totally prohibit the making of Kafir beer." Seconded by Mr. Martin, and negatived.

SERVANTS' CHARACTERS.

Mr. Hall (for Alexandria) moved: "That each Branch Association affiliated with the Central Association be urged to adopt a resolution agreeing that each member shall bind himself to give every native servant, upon leaving his service, a certificate of character, and that no member shall engage a native unless he produces such certificate from his last employer." Seconded by Mr. J. J. Vosloo.

Mr. Francis moved, as an amendment, "to omit all the words after the word character."

On a vote being taken, the amendment and motion were negatived.

CARRIAGE OF LIVESTOCK.

Mr. Adams (Kimberley) moved: "That the regulations governing the conveyance of livestock on the Cape Government Railways should be amended and brought in accordance with reasonable conditions, and that covered trucks should be supplied whenever possible for animals travelling very long distances, say, over 200 miles." Seconded by Mr. Rubidge, and agreed to.

COOL CARS.

Mr. Hall (for Lower Cathcart) moved: "To urge Government the necessity for cool cars on the Eastern System." Seconded by Mr. Gordon.

Mr. Rubidge (Zwaart Ruggens) moved, as an amendment: "To be run in connection with passenger trains."

On the vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

RAILWAY SERVICE.

Mr. Gordon (Stutterheim) moved: "To urge upon Government the necessity for an improved railway service for the Midlands and Eastern System." Seconded by the Hon. R. F. Hurndall, M.L.C.

Mr. Goulden moved, as an amendment: "And that separate accommodation be provided for natives."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to unanimously.

MR. LOUNSBURY.

The President announced that Mr. Lounsbury, Government Entomologist, was in attendance.

MORE POLICE WANTED.

The debate on this subject was resumed.
Congress adjourned at 6.10 p.m.

EVENING SITTING.

Congress resumed, at 8.0 o'clock, the debate on the Police question.
On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

AUDITORS' REPORT.

Mr. Sinclair (Post Retief) handed in the Auditors' report, as follows:

We beg to report that we have audited the accounts and found them correct.

We beg to draw the attention of Congress to the fact that the Secretary has closed the Bonus Fund standing over from the Somerset East Congress, with a considerable amount of that total unpaid.

We also draw attention to the fact that the bonus voted at East London last year has not been paid in full, but this would be more than met if arrears of branches were paid up.

There is an amount of £2 1s., which the Secretary received by cheque when ill, and cannot trace the drawer's name. If any branch has paid the amount in, and not received credit, it should notify the Secretary as soon as possible.—(Sgd.) H. Sinclair and L. J. Roberts.

General Sir E. Y. Brabant (East London) moved, "that the report be adopted." Seconded by Mr. Murray, and agreed to.

The Auditors' report for the Hutcheon Fund was read, viz., "audited and found correct." Mr. Rubidge (Zwaart Ruggens) moved the adoption of the report. Seconded by Mr. Hurndall, and agreed to.

ALARMING INCREASE OF STOCK THEFTS.

The Hon. R. F. Hurndall (Zwaart Ruggens) moved: "Owing to the alarming increase in stock thefts, the Government be requested to place the Cape Police on the same footing, and increase them to the same strength and efficiency, as before the recent retrenchment." Seconded by Mr. Rubidge, and agreed to.

PRINTED PASSES UNDER 'CATTLE REMOVAL ACT.

Mr. Gush (Central Albany) moved: "That a system of printed passes for the removal of stock be introduced and issued in book form, counterfoiled; such books of passes shall be issued to tenants and landowners, and only landowners shall sign them." Seconded by Mr. P. v. d. Walt.

Mr. H. Trollip (Craddock) moved, as an amendment: "To omit all words after 'landowner,' and insert, 'that every pass shall state the number, sex, ear-marks, brands, or other sufficient description, whereby such stock can be identified, and the issuer of the pass shall, in the case of stock not being his own, satisfy himself that the applicant is in lawful possession of the same.'"

Mr. Berrington (Wodehouse) moved, as a further amendment, to omit all words after "counterfoiled," and insert "and such passes to be signed by the R.M. or Field-cornet."

Mr. Bekker moved, as a further amendment, to add "Passes to be lawful only in the district of the issuer, and all passes to be returned to the original signee. When passes outside the district are required, the Magistrate only to have the right to issue the passes."

On a vote being taken, Mr. Berrington's and Mr. Trollip's amendments were agreed to, and the motion as amended was agreed to.

INADEQUATE PUNISHMENT FOR STOCK THEFTS.

Mr. Gordon (Stutterheim) moved: "That, in the opinion of Congress, the penalties imposed in cases of stock thefts are wholly inadequate. This Congress respectfully urges Government to take steps for the transportation of stock thieves, as the best means of checking the evil." Seconded by Mr. Laing.

Mr. Rubidge moved, as an amendment, to omit all words after "inadequate."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

RAILWAY FACILITIES FOR SCHOOL CHILDREN.

Mr. Goulden (East London) moved: "In the interests of education, and for the protection of children who have long distances to walk to school on lonely roads, to afford facilities on all convenient trains for the children of farmers proceeding to school, the same free transit as is granted to the children of railway employés; and where the cottages of gangers are more convenient than a station or halt, to allow such cottages to be recognised as a stopping place." Seconded by Mr. Coetzee.

Mr. Gordon (Stutterheim) moved, as an amendment, to insert the word "indigent."

Mr. Francis (Molteno) moved, as a further amendment, to omit the words "of farmers."

On a vote being taken, the amendments were agreed to, and the motion as amended was agreed to, as follows: "In the interests of education, and for the protection of children who have long distances to walk to school on lonely roads, to afford facilities on all convenient trains for the children of indigent parents proceeding to school, the same free transit as is granted to the children of railway employés; and where the cottages of gangers are more convenient than a station or halt, to allow such cottages to be recognised as stopping places."

Mr. Maasdorp (Albert) moved: "That the Secretary send a copy of this resolution to the Editor of the *Educational Gazette*, and request the several School Boards to give it their careful consideration." Seconded by Mr. Heynes, and agreed to.

INDEMNITY FORMS.

Mr. Goulden (East London) moved: "That the signing of the indemnity forms be abolished, as such is cumbersome and inconvenient, and serves no apparent usefulness." Seconded by Mr. Rubidge, and agreed to.

Congress adjourned at 10.15.

WEDNESDAY, APRIL 20TH, 1910.

MORNING SITTING.

Congress resumed at 9 o'clock. Minutes read and confirmed.

The Secretary read a telegram from Mr. J. Arnold, regretting inability to attend, and wishing Congress a successful meeting.

JOINTED CACTUS COMMITTEE.

The Hon. R. F. Hurndall, M.L.C. (Zwaart Ruggens), brought up the report of this Committee, as follows:—

Your Committee, having considered the matter referred to them, have to report:

While admitting the excellent work being done in certain districts in eradicating the Jointed Cactus, Congress again strongly urges the necessity of compulsory legislation for its complete eradication, as the facility with which it spreads renders it the most serious menace to the country; and, further, that it be a recommendation to the Government, in all cases where a farm is so infested with the Jointed Cactus as to be beyond the power of the owner to eradicate the plant, that such farm be taken over by the Government, the owner being paid such sum of money as the farm may be valued at, by specially appointed valuers. Thereafter the Government shall cause such farm to be cleaned, and when the Jointed Cactus has been thoroughly eradicated, the said farm shall be sold, and if there is any surplus over and above the price paid, plus the cost of eradicating the Cactus, such surplus be handed to the former owner. In all cases the former owner to have the first option of repurchasing the property.

The Hon. R. F. Hurndall (Zwaart Ruggens) moved the adoption of the report. Seconded by Mr. Goulden, and agreed to.

ELECTION OF OFFICERS.

Mr. Adams (Kimberley) moved, as an unopposed motion, "that the election of officers be taken with precedence to-morrow morning, and also the place for next meeting." There being no objection, the motion was agreed to.

PERMANENT WEED INSPECTORS.

Mr. B. J. Niland (Fort Beaufort and Adelaide) moved: "That Congress strongly urges upon Government to compel Divisional Councils to appoint permanent noxious weeds inspectors in all areas where the Jointed Cactus occurs." Seconded by Mr. J. H. King.

Mr. E. J. Collett (Midlands) moved, as an amendment: "That Congress strongly urges upon the Government to secure legislation giving the Government power to compel Divisional Councils to appoint permanent noxious weeds inspectors, when such a course may be deemed by the Government to be necessary, and that pending such legislation, the Government urges Divisional Councils to appoint inspectors in all cases where Jointed Cactus occurs."

Mr. Niland withdrew his motion, with the leave of Congress.

On a vote being taken, the amendment was agreed to.

NOXIOUS WEED ACT.

Mr. Frost (Tarka) moved: "That the Noxious Weed Act be made compulsory." Seconded by Mr. Thomas.

Mr. Francis (Molteno) moved, as an amendment: "So that any weed which had been declared a noxious weed in any district shall be declared a noxious weed in all districts."

On a vote being taken, the amendment was negatived, and the motion agreed to.

SPEARED THISTLE.

Mr. Gordon (Stutterheim) moved, for New England: "That the Speared Thistle should be compulsorily eradicated throughout the country." Seconded by Mr. Thomas.

By request, Mr. Pillans, Plant Investigator, passed round mounted specimens of so-called Scotch thistle, from which it appeared that the Speared Thistle was meant.

Mr. Struben (Midlands) moved, as an amendment: "And that the Department of Agriculture be urged to investigate and compile a list, for the guidance of Divisional Councils, of weeds that in its opinion should be proclaimed noxious throughout the Colony, and whose eradication should be uniformly undertaken."

On the vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

NO NEW CACTUS.

Mr. Hall (Bedford) moved: "To prevent the introduction of new vegetation plagues into the country, Congress is emphatically of opinion that no new plant and no species of the Cactus tribe ought to be introduced into this Colony without the consent of the Government Botanist; and then only when he is satisfied that such plant will be useful, and is not likely to spread and become a pest." Seconded by Mr. Struben, and agreed to.

MOUNTED SPECIMENS OF NOXIOUS WEEDS.

Mr. Jas. Butler (Cradock) moved: "That Government be requested to supply each Farmers' Association with a set of mounted and named specimens of the principal noxious weeds, and also to Divisional Councils and such schools whose committees apply for them." Seconded by Mr. Martin, and agreed to.

LIME AND SULPHUR FOR DIP.

Mr. Van der Walt (Naauppoort) moved: "Congress urges that lime and sulphur for dipping purposes be carried at half rate on the Railway." Seconded by Mr. Bekker.

Mr. Francis (Molteno) moved, as an amendment, to add the words "and caustic soda." On a vote being taken, both amendment and motion were negatived.

RAILWAY RATES ON SORTED WOOL.

Mr. Laing (Elliot) moved: "That Government be requested to have the railway rates on the carriage of wool modified, and adopt the same system as in the O.R.C., thus inducing growers to improve the get-up of the staple industry of the Colony, and as an incentive to the eradication of scab." Seconded by Mr. Francis.

Mr. Adams (Kimberley) moved, as an amendment: "That Government be requested to reduce in the near future the railway rates on wool, horns, hides, skins, and mohair, to Class C. rates."

Mr. McKee (Government Wool Expert), by request, addressed Congress on the wool question, and also replied to a number of questions.

On a vote being taken, the motion was negatived, and the amendment was agreed to.

IMPROVEMENT IN MERINO SHEEP.

Mr. Struben asked leave to introduce a motion dealing with the improvement of sheep, and under Rule 11, the necessary number rose in support, and leave was granted. Mr. Struben's motion was as follows: "That Congress is of opinion that the Government should take immediate

steps for the improvement of the Merino sheep flocks of this Colony, by the initiation of a scheme of supply, by importation or otherwise, of sheep best suited to the various portions of the Colony."

THE LATE MR. J. H. HOFMEYR.

Mr. Bekker (Steynsburg) asked leave to introduce a motion on the above subject, and under Rule 11 the necessary number of members rose in support, and leave was granted. Mr. Bekker's motion was as follows: "That this Congress wishes to place on record its appreciation of the services rendered to this country by the late J. H. Hofmeyr ('Onze Jan'), and expresses its regret at his lamented demise, as also its sympathy with the Africander Bond at the death of their founder and leader."

BLOEDPENS IN LAMBS.

Mr. Bekker (Steynsburg) moved: "That experiments be carefully undertaken by the Agricultural Department to enquire into and suggest a practical remedy for the disease known as Bloedpens in Lambs." Seconded by Mr. Frost.

Mr. Dixon, Senior Veterinary Surgeon, addressed Congress on the matter.

Congress adjourned at 12.45 till 3 p.m.

AFTERNOON SITTING.

Congress resumed at 3 o'clock.

Debate on "Bloedpens in Lambs" was resumed.

Mr. A. Welsh (Post Retief) moved, as an amendment, to insert the word "Jachtziekte."

The Hon. F. R. Hurndall, M.L.C. (Zwaart Ruggens), moved, as a further amendment, to insert the word "Lamziekte."

On a vote being taken, the amendments were agreed to, and the motion as amended was agreed to as follows: "That experiments be carefully undertaken by the Agricultural Department to enquire into and suggest a practical remedy for the diseases known as Bloedpens, Jachtziekte, and Lamziekte in lambs."

CURE FOR LAMZIEKTE.

Mr. Jas. Butler (Vryburg) moved: "That in view of the reported discovery of a cure or preventive for Gal-lamziekte, by the Mayer Bros., of Kuruman District, Government be urged to give same a fair trial, as if proved successful it will be of incalculable value to stock farmers all over South Africa." Seconded by Mr. Rubidge.

Mr. Sinclair (Post Retief) moved, as an amendment, "to insert after the word district, the words 'and by Mr. W. M. Gradwell, of Carlisle Bridge, known as Bowker's Cure.'"

The President ruled the amendment was inadmissible, as it is a proprietary medicine on the market.

On a vote being taken, the motion was agreed to.

HEARTWATER.

Mr. H. H. Hards (Upper Albany) moved: "That in investigations into the cure and prevention of heartwater, great care should be exercised in discriminating between that disease and Pasteurella, and that Government be urged to take steps to this end." Seconded by Mr. Hill.

Mr. Sinclair (Post Retief) moved "the previous question." Seconded by Mr. Thomas, and withdrawn with the leave of Congress.

On a vote being taken, and none being recorded, the motion dropped.

LUNGSICKNESS.

Mr. J. G. Thomas (Bolotwa) moved: "That Congress is of opinion that Lungsickness will never be stamped out as long as the Native Territories are allowed to remain a source of danger of infection, and therefore we respectfully urge the Government to proclaim the Animal Diseases Act in those Native Territories, as has already been done in the Colony proper."

Mr. Veterinary Surgeon Dixon said this was being done, and the motion was withdrawn with the leave of Congress.

OSTRICH DISEASES.

Mr. E. J. T. Pringle (Bedford) moved: "That Congress is of opinion that the time has arrived when Government should appoint a fully qualified Veterinary Surgeon to make a special study of the diseases, habits, and requirements of ostriches." Seconded by Mr. Ford.

Mr. W. Webb (Bathurst East) moved, as a rider, "and that the investigations already conducted be further proceeded with, and further, that a bureau of information be established."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

FENCING ACT.

Mr. Gordon (Stutterheim) moved: "In the opinion of this Congress the Fencing Act should be amended to apply to jackal-proof fencing, where the adjoining farms carry small stock." Seconded by Mr. Murray, and ordered to stand over.

NEW SUBJECTS TO BE PLACED AT HEAD OF AGENDA PAPER.

Mr. Francis (Cathcart) asked leave to introduce a motion on the above, and the necessary number under Rule 11 rising in support, leave was granted.

Mr. Francis handed in the motion as follows: "That in the future any subject which has not been discussed at the previous Congress shall be placed at the beginning of the Agenda."

AGRICULTURAL COLLEGE FOR THE EAST.

Mr. Gordon (Stutterheim) moved: "That in the opinion of Congress an Agricultural College should be established in the pure grass veld; and such college would best serve the Border districts if established in the Eastern Districts, where the peculiar condition of climate, soil, and animal diseases are dissimilar to that of the Western and Karroo belts."

Seconded by Mr. Edmonds.

Mr. Hurndall (Zwaart Ruggens) moved, as an amendment, to insert "after the word 'Eastern,' the words 'coastal and agricultural.'"

Mr. Berrington (Wodehouse) moved, as a further amendment: "That this Congress, while appreciating the action of Government in establishing a College in the Midlands, hopes that the Government will give the claims of the Eastern and coastal districts early consideration."

Mr. Goulden (East London) moved, as a further amendment: "That the Government be asked to establish an experimental farm in the Eastern coastal districts as soon as possible."

On a vote being taken, Mr. Hurndall's amendment was agreed to, the motion as amended was negatived, Mr. Berrington's amendment was agreed to, and Mr. Goulden's dropped.

EXPERIMENTAL FARM FOR BECHUANALAND.

Mr. Jas. Butler (Vryburg) moved: "That Government be urged to establish an experimental farm in Bechuanaland, with the object of, firstly, investigating various diseases amongst stock; secondly, ascertaining the best method of raising crops, and which are the best suited to this part of South Africa." Seconded by Mr. Rubidge.

Mr. J. J. Coetzee (Cradock) moved an amendment, as follows: "That in view of the great possibilities of dry-farming for opening up the semi-arid tracts of land in this country, that experiments should be undertaken by the Agricultural Department with the object of proving the possibility of this new method of Agriculture, and those who would be interested."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

LIGHT WINES.

Mr. Hall (Bedford) moved: "That Congress, while expressing its firm conviction that total prohibition will be far better for the welfare of our native population than to provide increased facilities for obtaining light wines or alcoholic drinks of any kind, strongly protests against the legislation of last Session in favour of cheap light wine licences, as discriminating between town and country, increasing the facilities for the consumption of drink, and possibly the demoralisation of our young folk; Congress urges that the legislation in question should be repealed." Seconded by General Sir E. Y. Brabant, and agreed to.

INCOME TAX.

Mr. P. J. J. Coetzee (Cradock) moved: "That a committee of three be appointed to consider and report on resolutions dealing with Income Tax." Seconded by Mr. Berrington, and agreed to. The following were appointed on the committee: Messrs. Laing, Murray, and P. J. J. Coetzee.

LOCUST DESTRUCTION.

Mr. E. J. T. Pringle (Bedford) moved: "Congress strongly urges legislation for the compulsory destruction of locusts in the voetganger stage." Seconded by Mr. Maasdorp.

• Mr. Hall (Bedford) moved, as an amendment: "In view of the success of the arsenical spray treatment, Congress strongly urges the necessity for a compulsory law for the destruction of locusts in the voetganger stage."

On a vote being taken, the amendment was agreed to.

Congress adjourned at 6 p.m.

THURSDAY MORNING.

Congress resumed at 9 o'clock. Minutes read and confirmed.

CHIEF INSPECTOR OF SHEEP.

The President mentioned that the Chief Inspector of Sheep had arrived.

ELECTION OF OFFICERS.

Mr. Hurndall, M.L.C. (Zwaart Ruggens) moved "that the President vacate, and that Mr. Francis take the chair." Seconded by Mr. Rubidge, and agreed to.

The Chairman called for nominations for President.

Mr. Welsh (Post Retief) nominated Mr. W. H. Hockly. Seconded by Mr. J. Adams, and agreed to with cheers.

The President resumed the chair, and thanked Congress for this continued mark of confidence.

Mr. Francis (Molteno) nominated General Brabant for Vice-President. Seconded by Mr. Edmonds.

Mr. A. Welsh nominated Mr. Hurndall, M.L.C. Seconded by Mr. Murray.

There being no further nominations, the President declared these gentlemen elected, and both returned thanks.

Mr. Adams nominated Mr. Hall as Secretary and Treasurer. Seconded by Mr. Rubidge, and agreed to. Mr. Hall returned thanks.

The following were nominated for the Vigilance Committee: Messrs. Adams, Struben, Francis, Bowen, Evans, Rubidge, Forbes, J. Arnold, Hards, and P. J. J. Coetzee. Mr. Hurndall (Zwaart Ruggens) moved "that Messrs. Pillans and McKee act as scrutineers." Seconded by Mr. Hall, and agreed to. While the scrutineers were at their work,

Congress considered the question of place for holding the next meeting. Invitations were issued for Vryburg, Graaff-Reinet, Uitenhage, Grahamstown, George, and Middelburg. An exhaustive vote was taken, and Graaff-Reinet was selected.

The scrutineers reported that Messrs. Adams, Struben, J. Arnold, and Evans were elected.

FENCING ACT.

The debate on this matter was resumed. The motion was withdrawn with leave of Congress, the mover being satisfied that the case is met by the present law.

SCAB ACT.

Congress decided to request Mr. Davison, Chief Inspector of Sheep, to address Congress, and that gentleman had a hearty reception on doing so.

Mr. Du Toit (Under Secretary for Agriculture) read a telegram stating there is no truth in the statement of an outbreak of East Coast Fever four miles from Bulawayo, where some cattle are suffering from a virulent form of redwater.

STRINGENT SCAB ACT.

Mr. Harwich (Komgha) moved: "That the Scab Act should be amended, with a view to greater stringency, and that the names of defaulters be advertised in the local papers." Seconded by Mr. Welsh.

Mr. Edmonds (Komgha) moved, as an amendment: "That, in the opinion of Congress, the time has arrived for Government to make a serious effort to eradicate Scab on the block system by Government officials."

Mr. Maasdorp (Albert) moved, as a further amendment: "And that a minimum fine be fixed for contraventions of the Scab Act."

Mr. Rubidge (Zwaart Ruggens) moved: "That a committee be appointed to consider the whole question and report." Seconded by Mr. Frank and agreed to.

INCOME TAX.

The Committee brought up their report as follows: "That Congress respectfully urges upon Government that productive improvements be exempted from Income Tax."

Mr. Murray (Zwaart Ruggens) moved the adoption of the report. Seconded by Mr. Bekker. On a vote being taken, the motion was negatived.

SIMPLIFIED FORM FOR ASSESSING FARMERS' INCOMES.

Mr. Murray (Zwaart Ruggens) moved: "That there be a simplified form for assessing farmers' incomes, by allowing a certain percentage of gross income as working expenses." Seconded by Mr. Laing.

General Brabant moved "that the question be now put." On a vote being taken, this was agreed to, and the question was put and negatived.

SCAB ACT.

Mr. Rubidge (Zwaart Ruggens) brought up this report, as follows: "This Congress is of opinion (a) that there should be a uniform stringent Scab Act for the Union of South Africa; (b) that owing to the failure of the legislation which has been enforced since 1887 to eradicate Scab, Congress advocates the block system, as proposed by the Chief Inspector of Sheep; (c) that the maximum penalty for contraventions of the Scab Act be raised from £20 to £50."

Mr. Rubidge (Zwaart Ruggens) moved the adoption of the report. Seconded by Mr. Berrington.

Mr. Hurdall, M.L.C. (Zwaart Ruggens) moved, as an amendment, "clause (b) be omitted."

On a vote being taken, the amendment was negatived, and the motion agreed to.

Congress adjourned at 12.45.

EVENING SITTING.

Congress resumed at 8 o'clock.

CLOSER UNION.

The President announced that the Conference of Agricultural Organizations had arrived at an unanimous decision. The representation clause was left untouched.

COMPULSORY DESTRUCTION OF LOCUSTS THROUGHOUT SOUTH AFRICA.

Mr. Goulden (East London) moved: "That the Union Government be asked to make the destruction of locusts in the voetganger stage a national question, and a compulsory destruction law be enacted." Seconded by Mr. Murray, and agreed to.

EXPORT OF STOCK TO BRITISH EAST AFRICA.

Mr. Gordon (Stutterheim) moved: "Congress request the Agricultural Department to provide better facilities for the export of stock to British East Africa." Seconded by Mr. Berrington, and agreed to.

EXPORT OF OSTRICHES TO BRITISH EAST AFRICA.

Mr. Malan (Koonap Heights) moved: "To allow British East Africa to be added to the list of Colonies and States exempted from the Act passed by the Cape Colony prohibiting the export of ostriches and Angora goats." Seconded by Mr. Sinclair, and ordered to stand over.

DAIRY EXPERTS.

Mr. Francis (Molteno) moved: "That it is desirable that Government should send dairy experts on tour through the Colony, to give lectures and demonstrations tending to improve the dairying industry; and further, to take steps to organise the industry, so as to regulate the distribution of butter by having refrigerating stores at certain centres." Seconded by Mr. C. Butler, and agreed to.

LIQUOR IN PROHIBITED AREAS.

Mr. Francis (Molteno) moved: "That the Liquor Laws be so amended that any native, not being a registered voter found in possession of intoxicating liquor in an area where the prohibition of intoxicating liquor to natives has been proclaimed, such native shall be liable to punishment by fine or imprisonment." Seconded by General Sir E. Y. Brabant, and agreed to.

Mr. Du Toit (Under Secretary for Agriculture) read a telegram from the Minister announcing that the purchase of the farm "Grootfontein," at Middelburg, had been provisionally agreed upon.

APPEAL FROM WATER COURT DECISION.

Mr. Struben (Midlands) moved: "That this meeting considers the term of three months allowed for appeal against decisions of the Water Court under the present Irrigation Act is inadequate, and should be extended to 12 months." Seconded by Mr. Martin, and agreed to.

GOLDEN BALL WHEAT.

Mr. E. J. T. Pringle (Bedford) moved: "Congress, while gratefully acknowledging the efforts being made, strongly urges upon Government to again endeavour to find the original home of the Golden Ball wheat; and further, that systematic experiments be made at an experimental station with a view to producing a rust-resistant wheat adapted to this country." Seconded by Mr. Hall.

Mr. Hurndall, M.L.C. (Zwaart Ruggens) moved, as an amendment, to omit all words after "Golden Ball wheat."

On a vote being taken, the amendment was agreed to, and the motion as amended was agreed to.

DIVISIONAL COUNCIL VALUATION.

Mr. E. J. T. Pringle (Bedford) moved: "That Parliament be requested to amend the Divisional Council Act, so that the basis of valuation may be intrinsic value of the land." Seconded by Mr. Struben.

Mr. J. G. Thomas (Bolotwa) moved, as an amendment: "Except buildings of a permanent nature."

Mr. Sinclair (Post Retief) moved, as a further amendment, to omit the word "intrinsic," and insert "prairie."

Mr. Gordon (Stutterheim) moved, as a further amendment, to insert "in rural areas," and withdrawn with leave of Congress.

On a vote being taken, Mr. Sinclair's amendment was agreed to, Mr. Thomas's amendment was agreed to, and the motion as amended was agreed to.

LABOUR RECRUITING.

Mr. Francis (Molteno) moved: "That, as it is a manifest injustice to the employers of labour in districts where there are no large native locations, and there is a scarcity of labour, to grant licences to labour agents, who induce natives to leave the district to be employed elsewhere, this Congress is of opinion that in future no such licences should be issued in districts where large native locations do not exist." Seconded by Mr. Hurndall, M.L.C., and agreed to.

RE-AFFORESTATION.

General Sir E. Y. Brabant (East London) moved: "That the importance of re-afforesting such of the native forests as have been cut out, and of planting Government lands suitable for the purpose with trees likely to produce valuable timber, be urged upon the Union Government when formed." Seconded by Mr. Hurndall, M.L.C., and agreed to.

FARMS ON ALLOTMENT.

Mr. Jas. Butler (Vryburg) moved: "That Government be requested not to advertise any more farms for allotment until an adequate water supply is assured on such property." Seconded by Mr. Rubidge, and agreed to.

NOTICE OF MOTION.

Mr. H. de Wilton Smith (Bontebok Flats) asked leave to introduce a motion dealing with shortage of trucks, but sufficient members not rising in support, leave was not granted.

Congress adjourned at 10 o'clock.

FRIDAY, APRIL 22ND, MORNING SITTING.

Congress resumed at 9.15. Minutes read and confirmed.

AGRICULTURAL PARCEL POST.

Mr. W. Edmonds (Komgha) moved: "That this Association desires the Government to grant cheaper Agricultural Parcel Postage." Seconded by Mr. Burgers.

Mr. C. Butler (Vryburg) moved, as an amendment, "to omit the word 'Agricultural.'"

On the vote, the amendment was negatived, and the motion was agreed to.

MEALIE BORER.

General Sir E. Y. Brabant suggested leaving this matter over pending the arrival of Mr. Lounsbury.

SIR HENRY DE VILLIERS AND THE CONVENTION.

Mr. Burgess (Cove Rock) asked leave to move, as an unopposed motion; a resolution dealing with Sir Henry de Villiers and the Convention. The motion was opposed, and the matter dropped.

JURY SYSTEM.

Mr. Sinclair (Post Retief) moved: "That this Congress desires the Union Government to consider the Jury system of trial, with a view to its amendment." Seconded by Mr. Slater, and agreed to.

LAND ACT.

Mr. Sinclair (Post Retief) moved: "That this Congress considers the time has arrived for a Land Act protecting the farmer and giving him some claim for compensation for permanent improvements." Seconded by Mr. Martin, and negatived.

RE-EARMARKING.

Mr. Edmonds (Komgha) moved: "Congress is of opinion that the re-earmarking of stock be made illegal and punishable by law." Seconded by Mr. Long.

Mr. Gordon (Stutterheim) moved, as an amendment: "To insert after 'stock' the words 'without the consent of previous owner,' and add, as a rider, 'and Congress expresses the opinion that the removal of one or both ears of stock is cruel, and hopes that Public Prosecutors will prosecute under the Act for Cruelty to Animals.'"

On a vote being taken, the first portion of the amendment was negatived, the second portion was agreed to, and the motion as printed was negatived. The portion agreed to read as follows: "Congress expresses the opinion that the removal of one or both ears of stock is cruel, and hopes that Public Prosecutors will prosecute under the Act for Prevention of Cruelty to Animals all persons guilty of the practice."

EXPORT OF OSTRICHES TO BRITISH EAST AFRICA.

The debate on this question was resumed.

Mr. Du Toit, in reply to questions, stated that British East Africa is not a neighbouring Colony within the terms of the Act.

Mr. Struben (Midlands) moved, as an amendment: "That Congress favours the inclusion of British East Africa among the States to which ostriches may be exported, providing they pass similar legislation to that of this Colony on this question."

On a vote being taken, the motion was negatived, and the amendment agreed to.

OSTRICHES EXPORTATION RESTRICTIONS.

Mr. Hill (Bathurst West) moved: "Congress views with alarm the statement that ostriches and ostrich eggs are imported into German West Africa from this Colony, and urges upon Government the necessity of protecting the ostrich industry." Seconded by Mr. Tomlinson.

Mr. Struben (Midlands) moved, as an amendment: "That Congress impress upon Government the urgent necessity of keeping a careful check upon the export of ostriches and ostrich eggs to States in South Africa other than British, with a view to making certain that the terms of the agreement arrived at are rigorously carried out by the parties thereto." On a vote being taken, the motion was negatived, and the amendment was agreed to.

MEALIE BORER.

The debate on this question was resumed.

Mr. Lounsbury (Entomologist), in response to an invitation, gave an outline of the steps taken and proposed by Mr. Mally for dealing with this pest.

Mr. Hards (Upper Albany) moved: "That this Congress is of opinion that the mealie culture is of so much importance that a Conference of growers be held at a convenient place, and that the Agricultural Department be asked to arrange this." Seconded by Mr. Rubidge, and agreed to.

QUITRENTS.

Mr. Berrington (Wodehouse) moved: "That the Government be requested to equalise all quitrents to a nominal sum of £5 per thousand morgen." Seconded by Mr. Gush, and negatived.

REDUCTION OF TRANSFER DUTY.

Mr. Frost (Tarka) moved: "That the Central Association is of opinion that the Transfer Duty be reduced to 2 per cent." Seconded by General Sir E. Y. Brabant, and agreed to.

SHORTAGE OF ROLLING STOCK.

Mr. Edmonds (Komgha) moved, as an unopposed motion: "This Congress wishes that the shortage of rolling stock for the Eastern System should receive the immediate attention of the Government." Seconded by Mr. Struben, and agreed to.

THANKS TO EXPERTS.

Mr. Roberts (Fort Beaufort and Adelaide) moved: "This Congress begs to offer a hearty vote of thanks to the Government officials and experts for their attendance at Congress, and to express its grateful appreciation of their services to the Colony." Seconded by Mr. Francis, and agreed to with cheers.

The vote was acknowledged by Messrs. Lounsbury, Davison and McKee.

ROYAL GAME.

Mr. G. S. Tomlinson (Koonap Heights) moved: "This Congress suggests that to protect Royal Game on private farms it is only necessary that the owner who can prove to the C.C. and R.M. of the district in which he resides, that he has Royal Game on his property, to register during the first month of each season the number he requires to shoot during that season; and no other person be granted a permit to shoot on that property. The owner to be permitted to allow any person to shoot on his property, providing he reports to the C.C. and R.M. the name and address of such person immediately after any Royal Game has been shot by any person other than himself." Seconded by Mr. Francis, and agreed to.

HORSE BREEDING.

Mr. Hards (Upper Albany) moved: "That the Cape Government be respectfully requested, in furtherance of the horse-breeding industry in the Cape Colony, to station two or more selected sires in suitable districts of the Eastern Province to serve approved mares at a fixed sum." Seconded by Mr. Gordon.

Mr. Rubidge (Zwaart Ruggens) moved, as an amendment, "to omit the words 'in the Eastern Province.'"

Mr. Struben moved, as a further amendment: "That Government be asked to initiate a system of subsidising sires in Cape Colony on the same lines as King's Premium Sires in England."

On a vote being taken, Mr. Rubidge's amendment was agreed to, the motion as amended was negatived, and Mr. Struben's amendment was agreed to.

TAX ON STALLIONS.

Mr. E. J. T. Pringle (Bedford) moved: "That in the opinion of this Congress an annual tax of £1 should be placed on all stallions over two years old." Seconded by Mr. Frost. Mr. Gordon (Stutterheim), "to insert £5 for £1." On a vote being taken, the amendment was negatived, and the motion as printed was agreed to.

Congress adjourned at 12.45.

AFTERNOON SITTING.

Congress resumed at 2.15.

IMPROVEMENT OF MERINO SHEEP.

Mr. Struben (Midlands) moved: "That this Congress is of opinion that the Government should take immediate steps for the improvement of the Merino sheep flocks of this Colony by the initiation of a scheme of supply, by importation or otherwise, of sheep best suited to the various portions of this Colony." Seconded by Mr. Bekker, and agreed to.

THE LATE MR. HOFMEYR.

Mr. Bekker (Steynsburg) moved: "That this Congress wishes to place on record its appreciation of the services rendered to the country by the late Hon. J. H. Hofmeyr ('Onze Jan'), and expresses its regret at his lamented demise, as also their sympathy with the Africander Bond at the death of their founder and leader." Seconded by Mr. Rubidge, and agreed to, members rising.

NEW SUBJECTS TO COME FIRST ON THE AGENDA.

Mr. Hall (for Mr. Francis) moved: "That in future any subject which has not been discussed at the previous Congress shall be placed at the beginning of the Agenda." Seconded by Mr. Martin, and negatived.

VOTES OF THANKS.

Mr. Hall (Bedford) moved: "That cordial votes of thanks be forwarded to the following: The Mayor, Town Council, Rev. Hanesworth, R. Crozier, C.C. and R.M., Divisional Council, M. T. Ford (Dramatic Society), L. J. Roberts, the Farmers' Association, Dr. Conry, and Rev. W. Stumbles."

UNDER SECRETARY FOR AGRICULTURE.

The President proposed a hearty vote of thanks to the Under Secretary for Agriculture, which was agreed to with musical honours. Mr. Du Toit responded to the compliment.

EXPERTS OF THE CAPE AGRICULTURAL DEPARTMENT.

Mr. Hall moved: "That the Experts of the Department be tendered the sincere thanks of this Congress, representing the farmers of the Cape Colony, for their services to the Cape Colony in the past, and that it be placed on record that this Congress considers the staff of experts to be the best in this country, and expresses its sincere hope that the staff may be retained by the Union." This was agreed to with cheers.

WINDING-UP COMMITTEE.

Mr. Sinclair (Post Retief) moved "that the Winding-up Committee consist of General Sir E. Y. Brabant, Messrs. Rubidge, E. J. T. Pringle, Sinclair, and Bekker." Seconded by Mr. Hurndall, and agreed to.

WINDING-UP COMMITTEE'S REPORT.

General Brabant brought up the report of the Winding-up Committee, and moved its adoption as follows:—

Present: General Brabant (who was voted to the chair), Messrs. Rubidge, E. J. T. Pringle, Sinclair, and Bekker.

Resolved that the several motions referring to Government be forwarded by the Secretary.

Resolved that the following accounts be paid: Enterprise Office, for printing, £9 12s. 6d.; A. Sharpe, for sundries, 4s. 6d.; hallkeeper and lighting, £1 10s.; telegrams, postage, etc., £7 10s.—(Sgd.) E. Y. Brabant, Chairman.

Seconded by Mr. Hurndall, M.L.C., and agreed to.

BONUS TO THE SECRETARY.

General Sir E. Y. Brabant proposed "that the Secretary receive a bonus of £100." Seconded by Mr. Roberts, and agreed to.

VOTE OF THANKS TO THE PRESIDENT, ETC.

Mr. Sinclair moved "a very hearty vote to the President, Vice-Presidents, Secretary, and Executive." This was carried with cheers and musical honours.

The President responded, as did also Mr. Hurndall (Vice-President) and General Brabant (Vice-President).

Resolved that a hearty vote of thanks be accorded the Press.

A hearty vote of thanks was accorded the representatives of the Central to the Conference of Agricultural Organisations, at Bedford, for their services. General Brabant responded.

The minutes were read and confirmed, and the session closed.

W. H. HOCKLY, President.

THOS. C. HALL, Secretary.

TABULATED SUMMARY OF CAPE PRODUCE REJECTED BY THE TRANSVAAL ON ACCOUNT OF ACCOMPANYING PESTS.

Article.	Disease.	Extent to which infected by Sample examined.								Destroyed.	Re-consigned.		Sorted.		Total Rejected.			
		1 %		1 % to 2 %		2 % to 5 %		5 % to 10 %			Above 10 %		Con-sign-ments.	Pack-ages.	Con-sign-ments.	Pack-ages.	Con-sign-ments.	Pack-ages.
		Con-sign-ments.	Pack-ages.	Con-sign-ments.	Pack-ages.	Con-sign-ments.	Pack-ages.	Con-sign-ments.	Pack-ages.		Con-sign-ments.	Pack-ages.						
Feb., 1910.																		
Potatoes ..	Fusarium Solani	..	..	..	..	2	4	2	5	1	13	..	..	5	22	5	22	
	Bacterial Disease	..	..	..	..	..	..	1	36	1	44	..	..	2	80	2	80	
	Soft Rot ..	..	..	..	..	..	..	..	..	..	..	..	..	1	5	1	5	
	Eelworms ..	..	..	..	..	..	..	..	..	..	..	..	..	1	11	1	11	
Apples ..	Tuber Moth ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Codling Moth ..	5	129	33	631	30	542	2	9	1	11+	..	..	65	1,289	68	1,311	
	Rhizopus ..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	1	1	
	Nigricans ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Pears ..	Codling Moth ..	4	680	55	3,936	61	3,414	8	119	5	257	5	119	111	7,849	133	8,406	
Plums ..	Codling Moth ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Peaches ..	Codling Moth ..	..	..	..	..	6	224	1	1	1	4	2	5	8	277	11	285	
Grapes ..	Fruit Fly ..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	7	
	Rotten ..	..	..	..	..	..	..	..	..	1	1	1	1	..	..	1	1	
Total for Feb., 1910 ..		9	809	92	4,624	102	4,201	15	171	10	326	11	134	192	9,434	226	10,131	
March, 1910.																		
Potatoes ..	Spongiospora	..	..	..	..	1	2	..	..	..	..	..	..	..	..	1	2	
	Scabies ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Apples ..	Eelworm ..	..	..	..	..	1	6	..	..	..	..	..	..	1	6	1	6	
	Bitter Pit and	..	..	..	..	1	18	..	..	..	..	..	..	..	..	1	18	
	Gloeosporium	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Fructigenum	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Fusicladium	..	..	..	..	..	..	..	..	1	27	..	..	..	..	1	27	
	Dactyrium	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Black Rot ..	..	..	..	..	..	..	..	..	2	50	..	..	..	..	2	50	
Pears ..	Codling Moth ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Codling Moth ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Peaches ..	Codling Moth ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Quinces ..	Codling Moth ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Lemons ..	California	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Red Scale	..	..	..	..	..	..	1	8	..	6	..	..	..	..	2	14	
Total for March, 1910 ..		..	..	58	4,269	69	3,201	6	105	13	115	7	10	125	7,562	146	7,780	

* Also listed under *Fusarium Solani* not included in total.† Also listed under *Eelworms* not included in total.

Western Province Agricultural Society.

THIRD EGG-LAYING COMPETITION

(Commenced 1st May, 1910, to finish 30th April, 1911). (Four Birds to a Pen.)

Record for MAY, 1910, and Totals to end of May.

Pen No.	Owner.	Breed.	Record for month.		Total to date.		Position to date.
			Eggs.	Weight ozs.	Eggs.	Weight ozs.	
1	W. P. Cowan ...	White Leghorns ...	...	...	44	77 $\frac{1}{8}$	5th
2	B. Kauffmann ...	Brown Leghorns ...	...	...	39	70 $\frac{1}{8}$	6th
3	K. B. Jobling ...	White Wyandottes ...	...	...	16	29 $\frac{1}{4}$	18th
4	R. G. Hudson ...	Brown Leghorns ...	...	...	4	7 $\frac{1}{8}$	28th
5	K. B. Jobling ...	White Leghorns ...	...	...	2	3 $\frac{1}{8}$	31st
6	S. A. West ...	White Leghorns ...	...	...	3	5 $\frac{1}{8}$	30th
7	A. F. Rackstraw ...	White Wyandottes ...	...	...	5	9	27th
8	J. W. Wright ...	White Wyandottes ...	...	...	18	32 $\frac{1}{8}$	16th
9	R. W. Hazell ...	Columbian Wyandottes ...	...	...	Nil	Nil	...
10	S. A. West ...	White Leghorns ...	...	...	1	1 $\frac{1}{8}$	32nd
11	C. H. van Breda ...	White Leghorns ...	...	...	8	15 $\frac{1}{8}$	24th
12	S. C. Skaife ...	White Wyandottes ...	...	...	35	57 $\frac{1}{8}$	9th
13	R. W. Hazell ...	White Orpingtons ...	...	...	Nil	Nil	...
14	Clifford Hoole ...	Buff Leghorns ...	...	...	14	26	19th
15	F. T. Hobbs ...	Silver Wyandottes ...	...	...	17	29 $\frac{1}{8}$	18th
16	B. Kauffmann ...	Black Minorcas ...	...	...	Nil	Nil	...
17	C. S. Boyes ...	White Leghorns ...	...	...	Nil	Nil	...
18	A. Aitken ...	White Leghorns ...	...	...	1	1 $\frac{1}{8}$	32nd
19	F. Muller ...	Black Minorcas ...	...	...	14	25 $\frac{1}{8}$	20th
20	B. Kauffmann ...	Brown Leghorns ...	...	...	22	36 $\frac{1}{8}$	14th
21	R. W. Hazell ...	White Wyandottes ...	...	...	Nil	Nil	...
22	J. P. Seabrook ...	Blue Andalusians ...	...	...	Nil	Nil	...
23	S. A. West ...	Red Sussex ...	...	...	Nil	Nil	...
24	R. W. Hazell ...	White Wyandottes ...	...	...	Nil	Nil	...
25	J. Leibbrandt ...	White Wyandottes ...	...	...	Nil	Nil	...
26	R. G. Hudson ...	Black Wyandottes ...	...	...	11	19 $\frac{1}{8}$	23rd
27	H. H. Bright ...	White Leghorns ...	...	...	19	34 $\frac{1}{8}$	15th
28	O. C. Macpherson ...	White Leghorns ...	...	...	19	37 $\frac{1}{8}$	13th
29	H. H. Bright ...	Black Leghorns ...	...	...	25	42 $\frac{1}{8}$	12th
30	H. H. Bright ...	White Leghorns ...	...	...	17	31 $\frac{1}{8}$	17th
31	C. H. van Breda ...	White Leghorns ...	...	...	47	80 $\frac{1}{8}$	3rd
32	S. Smith ...	Brown Leghorns ...	...	...	41	66 $\frac{1}{8}$	7th
33	F. T. Hobbs ...	Silver Wyandottes ...	...	...	Nil	Nil	...
34	A. Keppie ...	White Wyandottes ...	...	...	17	29 $\frac{1}{8}$	18th
35	C. H. van Breda ...	White Leghorns ...	...	...	64	109 $\frac{1}{8}$	2nd
36	S. Smith ...	White Leghorns ...	...	...	35	56 $\frac{1}{8}$	10th
37	F. T. Hobbs ...	Silver Wyandottes ...	...	...	Nil	Nil	...
38	(Vacant) ...	...	...	...	...	...	...
39	C. H. van Breda ...	White Leghorns ...	...	...	29	46 $\frac{1}{8}$	11th
40	R. J. Williams ...	Black Minorcas ...	...	...	Nil	Nil	...
41	F. Muller ...	Black Minorcas ...	...	...	Nil	Nil	...
42	C. H. van Breda ...	White Leghorns ...	...	...	29	61 $\frac{1}{8}$	8th
43	I. E. Wright ...	Brown Leghorns ...	...	...	6	10 $\frac{1}{8}$	26th
44	C. H. van Breda ...	White Leghorns ...	...	...	66	118 $\frac{1}{8}$	1st
45	B. Kauffmann ...	White Leghorns ...	...	...	Nil	Nil	...
46	S. A. West ...	Brown Leghorns ...	...	...	Nil	Nil	...
47	R. W. Hazell ...	Black Orpingtons ...	...	...	Nil	Nil	...
48	O. W. Pilkington ...	Rhode Island Reds ...	...	...	Nil	Nil	...
49	S. Smith ...	Brown Leghorns ...	...	...	13	21 $\frac{1}{8}$	22nd
50	C. H. van Breda ...	White Leghorns ...	...	...	15	25	21st
51	K. B. Jobling ...	White Leghorns ...	...	...	Nil	Nil	...
52	S. A. West ...	Brown Leghorns ...	...	...	3	5 $\frac{1}{8}$	29th
53	N. Cole ...	Brown Leghorns ...	...	...	42	80 $\frac{1}{8}$	4th
54	K. B. Jobling ...	White Leghorns ...	...	...	7	12 $\frac{1}{8}$	25th

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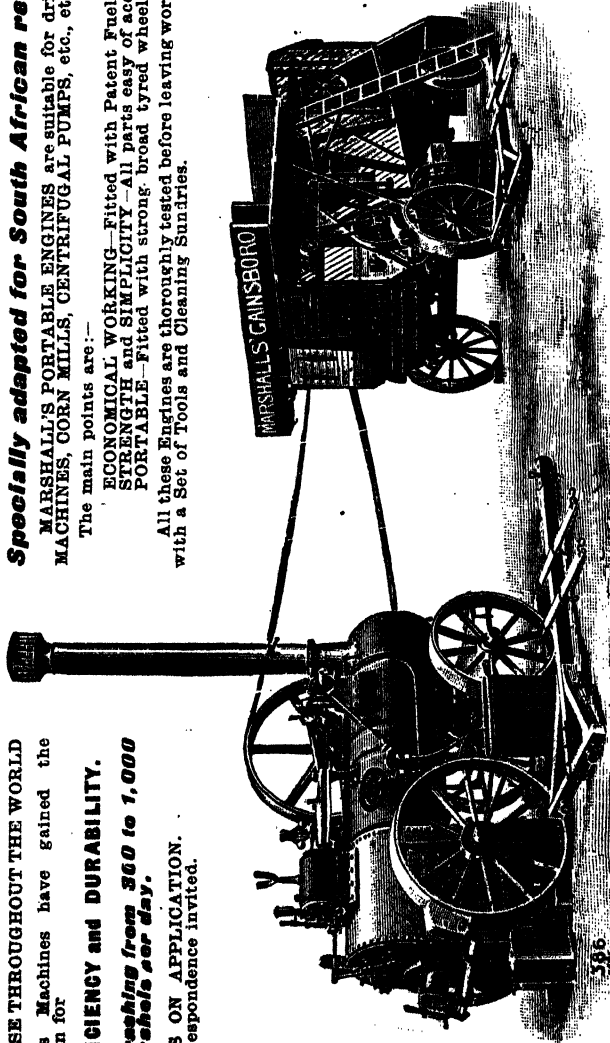
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CORRESPONDENCE.

Permanganate of Potash for Bee Stings.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—A short while ago I took out a beehive, and being a novice at this game, got fearfully stung on my hands, which swelled up to such an extent that I could not close them. The following day I had occasion to mix some permanganate of potash, and was surprised to find that within a short while after having dipped my hands into the solution the swellings went down rapidly. I take it that besides being useful for snake-bites, this crystal is invaluable for bee-bites. I found it was a good antidote for nettle stings also. This is most peculiar, as the latter is a vegetable poison.—Yours, etc.,

APIS.

Westminster, O.R.C., May 20.

A Manuring Problem.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I shall esteem it a great favour if you or one of my fellow-readers of the *Journal* will kindly assist me to solve the following problem.

I am farming on two different farms. The one in the Karoo has very rich soil, suitable for wheat, and never requires any manure. The other, on the mountain, where I used to sow oats and rye, has very poor soil, on which nothing will grow without manure. For the latter I have to get guano up from town, and it costs me £1 2s. 6d. a bag delivered here. Now, on the first farm, I have plenty of stable manure, but it would not pay me to carry it up here, on account of its bulk and the road being very heavy. The problem is: What can be done to reduce the bulk of the stable manure, to concentrate it, so to speak. I know you will not, and your readers need not, advise me to burn the manure to get the ash (and none of the ammonia). Thanking you in anticipation.—Yours, etc.,

F. C. BUHR.

Nieuwoudtville, May 10, 1910

There is no practical method of concentrating stable litter or farmyard manure. The only courses open in such a case are either the use of chemical fertilisers, which would be found expensive, or keep stock on the mountain farm for the express purpose of making manure. This can be done very effectively by feeding and bedding with plenty of straw. Stall-fed stock treated in this way with facilities for the conservation of the liquids, would supply a large quantity of good manure each season.

Lime and Milk.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—The *South African Journal of Science* for this month has an article by E. Pape, headed "Lime and Milk." It first speaks of shortage of lime in an assimilable state for stock on farms being caused by the exportation of produce of such farms, including milk and cheese (and, of course, stock and grain), beyond the farms boundaries, whereas if all produce of a farm were consumed within the farm, passing through animals (including human beings), the supply of lime in a state assimilable by animals would be kept up.

The writer illustrates this by saying that "for every 1,000 lbs. of milk sent away from a farm a loss of 1 lb. 12½ ounces of lime is incurred." Of course, in exporting stock and grain, yet more loss is incurred of lime in an assimilable state, and this loss totals up seriously.

He mentions also that with regard to *cheese* production the deficiency of lime in milk, which is necessary to any production of cheese, is seriously felt, and that this deficiency in milk can be met by providing drinking water rich in lime, or by either of these three ways:—

(a) (a hazardous course) By adding a soluble lime salt to the milk. He proceeds, or

(b) "By feeding a lime salt to the cattle, either by mixing it with the food or by providing a salt lick containing lime. This is an improvement on the first-mentioned method, as the deficiency of lime is made up in the body of the animal; but the best method is

(c) "To apply a lime fertiliser to the land. This will ensure an improved richness in the lime in the grazing, and the animal receives the lime in an assimilable condition."

Further on the writer mentions how it was proved by certain experiments that where milk of certain cows on certain pasturage refused to curdle, the cause was clearly shown to be a deficiency of lime; and he adds: "One cow was yielding milk which declined to coagulate (but) after three days' dosing with 50 grams of biphosphate of lime per diem the curdling of the milk became nearly normal." And he adds that the general conclusion of all experimenters was that "lime is absolutely necessary for the process of cheese-making" (as we know it is to body formation too).

A gram is about 15½ grains, and 28½ grams is one ounce avoirdupois; so it would seem that about two ounces of biphosphate of lime would be quite a safe dose for a cow that was not obtaining enough such biphosphate in her food.

All this is valuable information, but now as to practice. I have relatives in Griqualand West in places where cattle thrive excellently on farms almost purely pastoral; but now and again, at their fattest, they sometimes die of the mysterious "lamziekte," which, it is said, is caused by a deficiency of biphosphate in their food. Is it practically possible for a farmer then to apply what the writer mentions as "the best method" by applying a lime fertiliser to farms in Griqualand West, say, of 6,000 and 12,000 acres in extent? What amount of fertiliser would be required per acre, and what is the cost of biphosphate of lime? Can you kindly supply information on these points?

For the present, as it appears beyond the means of an ordinary farmer to apply biphosphate of lime to a large pastoral farm directly, please advise on the "next best" plan mentioned in the article under quotation, namely, feeding a lime salt to the cattle, either in food or by providing a salt lick containing lime. Would this help in preventing "lamziekte," as well as improving the cheese-forming quality of the milk? And in what form should the lime be administered, either with food or in a lick, and in what quantities? Should any biphosphate of lime be so administered in a salt lick, and if so, what quantities could be safely tried, and how? and would this be better or cheaper than giving ground bones or bones softened in ashes?

It is clear that if carbonate or phosphate or any other salt of lime in an assimilable state is swallowed by stock, then that stock in pasturing on the veld will be distributing to some extent such assimilable salts of lime, and this to the gradual improvement of that veld.

I, and no doubt many other farmers, do already give regularly to our stock, in troughs, slaked lime and salt in a dry form, for their general health's sake, and particularly as a preventive or cure of wire-worms, fluke and tapeworms; and many of us besides add occasionally to such lick a certain amount of Cooper's powder against "geil-ziekte." Some of us also give them besides lime and salt in water, i.e., in this way: We take hogshhead casks, lay them on their side and saw out eight inches in the middle of the length of these casks, thus making two big tubs. Then we pitch all round the edge of the bottom of the cask inside, and coat all over with coal-tar, and plant in the ground several inches deep near a water supply. In those tubs we put six beakers of salt and four of slaked lime, and fill them up with water; and we replenish them regularly with water, lime and salt as they get used up by the stock, which go to them when they require this drink, as they know best. That is an old receipt, which is given in old numbers of the *Agricultural Journal*.

What is new is to find the proposition made to give animals phosphate of lime internally. It has occurred to more than one before, but the article in the *South African Journal of Science* mentions actual cases of its being thus used as a *medicine* internally. It would be well if the Veterinary Department would consider and advise upon this and the question, can biphosphate of lime be advisedly given, and how, as a lick or in a drinking tub, as above mentioned, under any circumstances and in any localities—for instance, where "lamziekte" is prevalent and

where internal parasites are troublesome—and in what ways are such licks or drinks best arranged? Of course it is very difficult to give stock medicines in any way but by licks and “free drinks.”—Hoping for advice, yours, etc.,

AN OLD FARMER.

East London, May 20.

The general practice followed in this Colony, when a deficiency of lime phosphates is feared, is to dose the stock regularly with sterilised bone-meal. This was recommended years ago by the late Mr. Hutcheon, and has invariably proved successful in combating the ravages of lamziekte. At any rate, it is the only preventive known so far. As to milk production and the influences of lime phosphate, no experiments, so far as we are aware, have been attempted in this Colony. Before satisfactory conclusions could be obtained it would be necessary for a complete and exhaustive series of experiments to be made, which would extend probably over several years.—Editor, *Agricultural Journal*.

Poisoning Small Birds and Hares.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I notice in the *Journal* of April a question by Mr. N. Blanckenberg, what kind of poison should be used for killing small birds, viz., during the time of ploughing, the sparrows and finches? I am glad that Mr. Blanckenberg has taken up this matter, for here we have the sparrows and those miserable “dikbek sijsjes.” The best remedy I know of thus far is: Take half a bucket of water, and put a tablespoon full of arsenic in it and a coffee cup of sugar, and boil that for about five minutes. Stir the mixture well during the boiling to keep the poison from the bottom of the pot. Having allowed it to cool, one puts as much wheat in it as can be covered by it, and allows that to soak for, say, 24 hours. Sow the wet wheat on a Saturday night on the ploughed half “akker.” I would be very glad if any of your readers, knowing a better remedy, would acquaint us with it by means of your valuable *Journal*.

We have another plague here, but I have an excellent remedy for that, which I am going to tell you of, that you may spread it through your *Journal*. We are terribly harassed by “reebok hares” in gardens and lands. This is our remedy: Take a gallon of water and a tablespoonful of arsenic in a coffee cup of sugar; boil it for a few minutes, and immerse a sheaf of oats with the side of the ears in the boiling poison, and leave it there for half an hour to soak. Take the sheaf out and bind it in handfuls with strings, and plant these with the stubble-side in the land where the hares do damage: But this should be in a fenced-in land, where no small stock, cattle or horses can get in, for any animal that eats of it will die. These poisoned oats will stand for months, even if it should rain. The straw remains poisoned. Therefore it is necessary to deal carefully with it. When all the hares have been killed one should burn the remaining dry oats.—Thanking you for insertion of the above, I am, etc.,

W. H. L. KOTZE.

Brakfontein, Hardeveld, Namaqualand, April 22, 1910.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I notice in your issue of April last a letter of Mr. N. A. Blanckenberg, writing on the plague of sparrows and finches. I am really glad that this gentleman has written on the subject, for I myself have considered the matter for a long time and what could be done to decrease the number of those animals. I quite agree with my friend except as to the point of poisoning them on a Sunday; I am of opinion that the week is long enough for that purpose. Neither is it necessary to plough half an “akker” for that purpose. The poison may be spread broadcast on lands which have just been sown.

I once tried to prepare arsenite of soda exactly as for locusts (a little stronger), and to soak wheat in it; the result was good. I have heard of another remedy, viz., to boil wheat in salt and to leave it there for 24 hours, and then to scatter it on a convenient place for those little animals to pick it up. This last-named plan I have obtained from reliable sources in the Transvaal, where the plague is still worse than here.—Thanking you for the insertion, I am, etc.,

J. H. VAN DER WALT.

Welvanpas, Middelburg, May 5, 1910.

Handpower Threshing Machines.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—It is a pleasure to be able to meet the request of "F.M." of Barkly East, re the above machine. The first and last time I saw such a thing was more than thirty years ago at my father's place, who had bought one for £25 or £30. He threshed with it for about 2 or 3 days, or rather tried to, and put it aside and continued threshing in the old-fashioned method—as "F.M." calls it. Later on we have been favoured with a machine worked by 8 or 10 horses or mules, which at last was replaced by steam threshing machines; the last-named is the only machine which can thresh so that chaff, straw and grain are separated. I can recommend "F.M." to furnish himself with a 4 horse-power steam chaffmaking machine, or if he might wish to have one of higher power, they are to be had up to 10 horse-power; such a machine threshes from 700 to 800 muids of oats per diem. With the chaffmaking machine one may thresh just as one prefers; you may make all your straw into chaff or leave all the straw. If "F.M." would write privately, I am willing to give him all the required information, that is, if he wants to go in for a steam machine.—Yours, etc.,

W. P. BAARD, J.P.

Honigklip, Vredenburg, May 4th, 1910.

The Dangers of Improperly Prepared Lucerne Hay.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Through this letter I want to draw the attention of your readers to the use of lucerne hay. I consider lucerne hay a sound feed for animals. But I wish to speak now only about horses, for which I have used it, and in which case I have also noticed the danger which lurks in improperly prepared lucerne hay. Lucerne hay can be a good food, but not without proper preparation. I do not blame the hay at all, but I blame those who prepare it.

Sometimes the lucerne, being still green and wet, is pressed and sold by some people. The result is that it gets mouldy and totally unfit for use. It is, as it were, a poison for horses. It causes the animal to become powerless, and it coughs worse than a horse having the "nieuwe ziekte." And the result is that the horse ultimately dies. The yellow lucerne hay, which mostly is of a pleasant smell, is good, and I can recommend it as extremely good. But the hay which, on opening the bale, is black inside and also smells very damp, and even sometimes is full of dust, is the lucerne referred to by me as a poison for horses. I won't therefore blame lucerne hay, but I am trying to draw the attention of your readers to the use of it.—Yours, etc.,

J. M. KEEVY.

Doornfontein, Jansenville, 20th May, 1910.

Snake Bites.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—If I may ask, can you or any of our readers inform me through your widely-spread *Journal*, why the snake known as the Ringhals should be venomous on some occasions and not on others. I witnessed a dog bitten a few days ago, which died within half an hour afterwards, and yet I have seen on two other occasions dogs bitten by the same snake and they never ailed anything from the effects of the bite.—Yours, etc.,

P.J.

Port Alfred, May 30, 1910.

This is a problem beyond the scope of the Agricultural Department. Perhaps some correspondent can offer enlightenment. One possible explanation of the cases where the bites were harmless is that the snake venom was temporarily exhausted when the snake struck at the dogs.

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CERTAIN DEATH TO LOCUSTS.

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it kills them instantly and will
save your valuable crops from
being destroyed.

Farm Night Soil.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—With reference to the improvement of soil and the prevention of exhaustion, I would ask to be allowed to open the subject of the disposal of "night-soil," etc., on farms. This is a subject connected both with agricultural economy and the health of the agricultural population, white and black. On both these grounds I venture to suggest to you the advisability of the Department of Agriculture, and that of Health, being asked to advise on this subject through the *Agricultural Journal*. In some places human excrement is distributed in open air about a homestead, and in others it is, at the best, simply accumulated in a cesspit, and indefinitely. All this is waste and a great danger to health. In towns there are Municipal regulations, more or less effectual, for getting rid of this waste product safely, and sometimes for turning it to some account, more or less sanitary, for tree plantations, etc; but on farms enteric fever and diphtheria has been often produced and caused much loss of life by neglect of sanitary arrangements. At the same time, valuable manure has been absolutely wasted. The subject is not pleasant, but the danger ought to be faced and the loss prevented. One way of dealing with these waste products was carried out by the late Dr. Fitzgerald at the King William's Town Hospital, and in the public offices and prison there, and this is worth mentioning as suitable for farms, though it may be that there are objections to it. These can be discussed. Dr. Fitzgerald held that the ordinary so-called "dry earth system" was not a dry earth system at all, because the liquids were at once mixed with the solids in the earth deposited, and fermentation and dispersion of injurious germs was at once started and continued. To prevent this he instituted, with great apparent success, what he called the "real dry earth system." He placed a narrow deep tub in front, and clamped to a square deep tub, so that the former was in position to receive liquids and the latter solids. He used the finest dust, the sweepings of the streets fitted, to deposit at the bottom of the square receptacle, and he put into it with a grocer's scoop from time to time. He said that fine dry dust was all that was absolutely necessary by way of dry earth, but he used to improve upon it by adding sifted wood ashes and sifted slaked lime, and mixing it well. This he had ready mixed under a shed, and boxes of this "dry earth" were placed where they were wanted. He proved that in three days all the solids were converted into pure and absolutely inodorous earth, and he handed this round the King William's Town Council Chamber, and convinced the Town Council perfectly. All the liquids from the latrines were conveyed to a pit filled up with charcoal, covered with earth. He believed that this charcoal would disintegrate all the liquid that was passed into it for an indefinite period, and there would be no odour; but it is said that in this particular, and this alone, he was mistaken, possibly by some miscalculation, and consequently the system was dropped in the public offices. But it was everywhere acknowledged that his method of dealing with the solids was perfectly successful. These were removed every few days and placed under a shed, and eventually put into the ground around the hospital, among the trees. Now on a farm in other countries the liquid manure is either kept in a cask, with lime, I believe, or emptied into the tank in which manure is being rotted; and on a farm all these products could thus be returned to earth with advantage. The question, therefore, is: Would not Dr. Fitzgerald's system be advantageous on farms, and be safe and result in removal of serious danger on farms, and what other system would be better?—Yours, etc.,

RETIRED FARMER.

East London, May 20.

There are so many excellent systems now available for the disposal of night-soil on farms, from the septic tank to really effective dry-earth closets, that no self-respecting farmer need not be troubled by this matter. Any reputable firm of implement or hardware merchants can supply our correspondent with full particulars.

WANTED BONES & HORN PITHS

In any quantity. Highest Price offered. Apply
Advertiser, Central News Agency, Ltd., Long
Street, Cape Town.

FRUIT EXPORT.

Return of Fruit Exported from Cape Colony during month of April, 1910.

Port of Shipment.	Destination.	No. of Packages.	Description of Fruit.	Quantities.	Value.
					£ s. d.
Cape Town ...	England ...	2	Apples ...	60	0 6 0
" ...	" ...	2	Pomegranates ...	60	0 6 0
" ...	" ...	27	Quinces ...	1,590	7 19 0
" ...	" ...	86	Melons ...	538	17 2 6
" ...	" ...	3,587	Grapes ...	44,965	575 1 4
" ...	" ...	7,497	Pears ...	218,795 lbs.	1,115 12 6
East London ...	" ...	40	Pears ...	115 lbs.	3 0 0
Cape Town ...	German South West Africa.	1	Figs ...	200	0 5 0
" ...	" ...	1	Medlars ...	24	0 5 0
" ...	" ...	4	Cocoa Nuts ...	50	0 8 4
" ...	" ...	539	Apples ...	68,048	216 6 9
" ...	" ...	237	Pears ...	37,936	96 19 9
" ...	" ...	47	Grapes ...	2,393 lbs.	18 3 9
" ...	" ...	2	Sweetmelons ...	24	0 5 0
" ...	" ...	8	Watermelons ...	46	1 1 0
" ...	" ...	36	Oranges ...	5,026	27 3 6
" ...	" ...	28	Lemons ...	4,665	22 4 0
" ...	" ...	7	Pineapples ...	682	2 9 0
" ...	Walfish Bay ...	26	Bananas ...	18,800	22 10 0
" ...	" ...	2	Apples ...	60	0 3 6
" ...	" ...	2	Bananas ...	72	0 4 6
" ...	St. Helena...	2	Pears ...	72	0 4 6
" ...	Lobito Bay ...	3	Apples ...	600	1 10 0
" ...	" ...	1	Apples ...	100	0 10 0
" ...	" ...	1	Pears ...	25	0 3 6
" ...	Lisbon ...	20	Pears ...	1,200	5 0 0

FOREST DEPARMENT.

WOODEN FENCING DROPPERS.

Wooden Fencing Droppers in bundles of 50 of an average weight of 125 lbs. per bundle, and cut in 4½ ft. lengths (or to order, both as regards diameter and length, at prices to be quoted on application according to size required) may be had at £1 per 1,000, free on rail at the following stations:—Retreat, Greytown Platform, Maitland and Ceres Road, on application to the District Forest Officer in charge of the adjacent Plantations of Tokai, P.O. Retreat, Fort Cunynghame, P.O. Toise River, Uitvlugt, P.O. Mowbray, and Kluitjes Kraal, P.O. Ceres Road, respectively.

These droppers are of Pine and have an average thickness of one inch and are durable. Hardwood droppers of Eucalypt and Wattle woods require to be specially ordered and are supplied at special rates.

The weight of droppers may be considerably reduced by purchasers ordering their supplies to be cut and stacked a month or two before delivery is required.

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Of the very best quality suitable for use with gas suction engines is obtainable, f.o.r., at Fort Cunynghame Plantation, P.O. Toise River, and at Port Elizabeth Plantation at £2 per ton of 2,000 lbs., and on application to the District Forest Officers, Kluitjes Kraal, P.O. Ceres Road, and Elgin, P.O. Grabouw, Caledon, at £2 15s. 0d. per ton of 2,000 lbs., free on rail.

A Comfortable Bed

depends on the Mattress to hold the body in a healthy and restful position. Staples' Rest on Mattress is now acknowledged as

: THE ACME OF PERFECTION. :



No. 1.—Showing the healthy natural position on Staples' Mattress, the springs moulding themselves to the body, every part of which receives perfect and independent support.



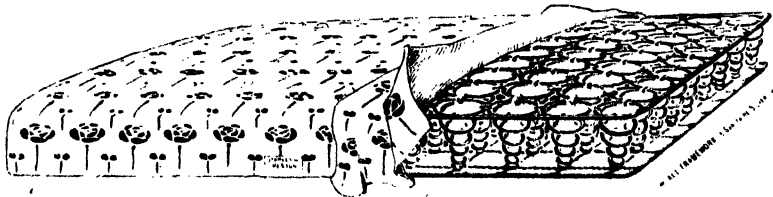
No. 2.—Showing the unhealthy and injurious curve the body is forced to assume on the old woven wire mattress.

The above illustrations show, without any explanation, why Staples' Mattress has taken its place as the Healthy, Modern and Sanitary Mattress.

The old woven wired mattress is supported at two ends only, and when the weight of the body is placed on it, it sags in the middle.

Staples' Mattress—because of its construction—cannot sag. Look at the illustrations. Each spring works independently, and upwards.

The springs mould themselves to the figure—supporting every muscle and portion equally. This is partly the secret of its success. It means reaping the full benefit from sleep.



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PORT ELIZABETH.

NOTES ON THE WEATHER OF APRIL, 1910.

By CHARLES M. STEWART, B.Sc., Secretary to the Meteorological Commission.

A practically normal pressure with unusually warm days and cold nights; a deficiency of rainfall amounting to drought over the greater part of the country; a small number of thunderstorms; some severe frosts; unusually clear skies, with an average fog-frequency; a marked prevalence of S.E.ly winds in the West, W.ly in the interior, and Easterly in the East; such were the leading features of the weather of April, 1910.

DIVISION.	Mean Rainfall (1910).	Mean No. of Days.	Average Rainfall (1891- 1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ...	2.48	8	2.94	7	—0.46	— 16
South-West ...	1.49	5	2.18	5	0.69	— 32
West Coast ...	0.63	2	1.01	4	—0.38	— 37
South Coast ...	0.83	5	2.28	6	—1.45	— 64
Southern Karoo ...	0.48	4	1.23	3	—0.75	— 61
West Central Karoo ...	0.29	1	0.88	3	—0.59	— 67
East Central Karoo ...	0.38	2	1.14	4	—0.76	— 67
Northern Karoo ...	0.40	2	1.48	4	—1.08	— 73
Northern Border ...	0.05	1	1.60	4	—1.55	— 97
South-East ...	0.50	4	2.37	6	—1.87	— 79
North-East ...	0.81	3	1.94	6	—1.13	— 58
Kaffraria ...	0.59	3	2.08	6	—1.49	— 71
Basutoland ...	0.84	4	2.42	7	—1.58	— 65
Durban (Natal) ...	...	...	2.89	...	...	...
Bechuanaland ...	0.16	1	2.00	6	—1.84	— 92
Rhodesia ...	0.02	1	1.43	4	—1.41	— 99

Precipitation, during the month, amounted, on the mean of 329 stations, to only 0.80 in. on 3 days, being 1.18 in., or 60 per cent., less than the normal depth. This amount is 1.82 in. less than last month, and 1.29 in. lower than the mean for the corresponding month of last year. As shown in the tabular statement, the mean divisional rainfall was below the average all over the country, the deficit ranging from 16 per cent. in the Cape Peninsula to 99 per cent. in Rhodesia. The mean deficit exceeded 50 per cent. over all sections of the country except those constituting the winter rainfall area. The mean quantities over each rainfall section were considerably below those of last month, except over the West Coast, where there was an increase of over 40 per cent.; while, compared with April, 1909, there was a similar decrease common to all the divisions except the Cape Peninsula and the South-West, which had about double the amounts then recorded. Analysing the monthly totals, it is found that of the 329 stations, 29 suffered from absolute drought throughout the month; 132 had 0.01—0.50 in.; 93 had 0.51—1.00 in.; 48 had 1.01—2 ins.; 14 had 2.01—3 ins.; 8 had 3.01—4 ins.; 3 had 4.01—5 ins.; leaving two (2) with over 5 ins., viz., St. Michael's, 5.20 ins., and Maclear's Beacon with 5.45 ins., both on Table Mountain. Of the thirteen having more than three inches (3 ins.), twelve (12) were situated in the Cape Peninsula, Ceres, in the South-West, forming the additional station. Similarly the maximum falls in 24 hours were nowhere very

large, in no case reaching the amount of two (2) inches. Thus of 316 returns containing the necessary details, 248 had "nil" to 0.50 in.; 49 had 0.51—1.00 in., and 19 had more than one inch; of these 19, the largest quantities recorded were 1.61 in. at Devil's Peak (Nursery) and Groot Drakenstein; 1.60 at the Devil's Peak (Block-house), and 1.55 ins. at Newlands, all on the 23rd.

Thunderstorms were comparatively infrequent and local in occurrence, being noted at 110 stations on 20 days, most widely on 21st, 18th, and 20th. One fatality from lightning is reported from Uitenhage District on the 16th. *Hail* occurred at 10 stations on three days, principally on 21st; no damage reported. No *Snow* was reported, but *Sleet* fell at 4 stations on three (3) days.

Temperature, Cloud, and Wind.—The mean temperature of all stations for the month was 63.0°, being 3.7° cooler than in March last, and 0.5° below the mean for April of 1909. The night temperatures were falling much more rapidly than the day; the mean minimum (51.3°) is 6.1° lower than in March and 2.0° lower than in April of last year, whereas the mean maximum (74.8°) is only 1.3° below the corresponding value for the preceding month, and 1.1° higher than in April, 1909. Compared with the normals, the mean monthly temperature is 0.4° higher than usual, the excess being due to the days being 1.8° warmer than usual, although the nights were one degree (1.0°) colder than the average. The mean daily range was 23.3°, or 2.8° more than usual. At the individual stations, the monthly temperature was above the average in the Cape Peninsula, over the West generally, in the interior, and at those stations situated some distance from the South Coast, the excess ranging from 0.4° at Storm's River (and Port St. John's) to 4.0° at Port Nolloth. The Coast stations eastward from Cape Agulhas were mostly cooler than usual by amounts exceeding one degree, whilst the deficit in mean temperature in the South-East and Kaffraria were mostly less than one degree. The actual deficiencies varied from 0.1° at Teyateyaneng and 0.3° at Lovedale to 3.2° at Cape St. Francis. At Hopefountain, in Rhodesia, the mean of the month was 3.5° lower than usual. The days were much warmer than usual at most places not actually situated on the coast, with the exception of a few stations in the South-East and Kaffraria, where the deficiency was mostly small, i.e., less than one degree. The excesses in the mean maximum temperatures were greatest in the West and the interior, being 7.5° at Port Nolloth, 6.6° at Kimberley, 5.2° at Groot Drakenstein, but were mostly between 1 and 2 degrees in the Eastern portions of the Colony. The deficits were mostly between 1 and 2 degrees along the South Coast, reaching 3.5° at Cape St. Francis, but were considerably less elsewhere. At Hopefountain, the mean maximum was 2.9° below the average. The nights were mostly colder than usual by 1—2 degrees, increasing, however, to about 3 degrees along the South Coast, except at a few stations in the Cape Peninsula, where the mean minima were above the average, and at one or two places in Kaffraria. The deficits in the night temperatures ranged from 4.2° at Hopefountain, and 3.1° at Aliwal North, to 0.2° at the Royal Observatory and Wynberg, in the Cape Peninsula; the excesses varied between 3.3° at Disa Head (Table Mountain) and 0.1° at Concordia (Knysna). The mean warmest station was Port St. John's with 68.8°, and the mean coldest Hanover with 58.1°, a difference of 10.7°. The highest value of the mean maximum temperature was 83.4° at Mochudi, and the lowest of the mean minimum, 40.3° at Hanover. The most noteworthy warm spell during the month was from 10th to 15th, although the highest readings for the month were recorded at some stations also on 2nd, 3rd, 5th, 7th, 8th, 15th, 21st, 29th, and 30th. The coldest periods were 18th to 20th, and from the 22nd to the end of the month, notably, the 27th and 26th. The mean value of the highest readings (88.9°) was actually 5.1° above the corresponding value for the previous month, and 2.4° above the similar value for April of the previous year. On the other hand, the mean of the lowest readings (40.6°) was 6.1° lower than in March last, and 2.4° below the corresponding mean for April, 1909. The mean monthly range (48.3°) was therefore unusually large for the month. A noteworthy feature of the temperature during this month was the occurrence of readings exceeding 100° F., the highest being 101.2° at Groot Drakenstein on the 12th, whilst the other extreme was 29.0° at Teyateyaneng on the 27th, and Hanover on the 28th. The extreme monthly range over all stations was therefore 72.2 degrees F.

Frosts of considerable severity for the season were reported from some localities as occurring towards the end of the month, damaging mealie crops at Theefontein (Hanover District) and Kokstad, killing the only mealie crops at Herschel. In other localities, again, as at Mount Ayliff, the absence of frosts of any great intensity has enabled a larger amount of grain to be reaped than was anticipated. Thirty-five (35) instances of this phenomenon were reported on 14 days, 1st to 3rd, 14th, 15th, 19th, 22nd to 24th, and 26th to 30th, most widely on 26th and 27th. At Retreat, in the Cape Peninsula, the mean minimum on grass was 44.7, or 6.4° below the shade minimum; the only instance of frost noted there was on 28th, when a temperature of 30.4° was registered, the highest reading of this thermometer being 58.3° on 6th.

The mean percentage of *Cloud* (38 per cent.) was unusually low for the month, and was fairly uniform over the whole country, averaging 45 per cent. in the West Coast, about 40 per cent. over almost the whole of the other divisions, but falling to 24 per cent. in the Northern Karoo and 21 per cent. in the North-East. The extreme amounts registered were 65 per cent. at Port St. John's and 2 per cent. at Mochudi. *Fogs and Mists* were slightly less than last month, being reported 109 times on 26 days of the month, more particularly on the 9th, 8th, 4th and 7th. No fog was reported on 18th or the last three days of the month. The prevailing morning *Wind-Direction* was E. to S.E. in the West and South-West, Westerly along the coast, Easterly (N.E. to S.E.) in the East and North-East, and N. to N.W. at a few of the stations on the higher plateaux. The mean *Force* (1.78) corresponds to a velocity of 7.3 miles per hour, and is slightly less than last month, but the same as in April, 1909. The winds were strongest along the South Coast, and weakest over the Karoos. At the Royal Observatory, North-West and South winds were of equal frequency; the South winds, however, showed a decrease of about 13 per cent., while those from S.S.E. were 8 per cent. in excess of the average frequency. There was also a marked increase in the number of calms. The mean force corresponded to a velocity of 4.9 m. per hour, or slightly more than half the mean velocity during the previous month, and 1.2 m. per hour less than the normal. *Strong Winds and Gales* were reported from 15 stations on 10 days, principally the 22nd. *Hot Winds* were noted at 7 stations on 5 days, but no instance of a *Dust-storm* was recorded. An *Earthquake Shock* was felt at Kokstad on the 14th. The mean barometric pressure at the Royal Observatory was 30.05 ins., or less than 0.01 in. below the normal value.

At the end of the month, owing to the drought over large areas, the agricultural prospects for winter were by no means bright, water being scarce, the veld dry and parched, although stock were mostly still in good condition. Caterpillars were reported as causing considerable damage at Schuilhoek (Div. Hanover), and an insect (locally known as Toktokie) was proving very destructive to pumpkins, watermelons, etc., at Theefontein (Div. Hanover).

OBSERVERS' NOTES.

VRUCHTBAAR.—The much desired rainfall on the 20th and 24th came just in the nick of time, as farmers were anxiously waiting for rain, to start ploughing. All fruit crops are harvested now, and ploughing and pruning of fruit trees will begin, as soon as the winter rains set in, in earnest.

THEEFONTEIN (Hanover).—Heat during first half of month quite tropical. Clouds appeared every day with unfailing regularity. Winds light, and mainly from N.W. Rainfall (0.51 in.) very small for the month, being the last of rainy season. Several sharp frosts after 20th, doing considerable damage to late mealie crops. Insect, known locally as Toktokie, very destructive to pumpkins, watermelons, etc. Veld generally looking dry, and prospects for coming winter not of the brightest. Halley's comet seen quite clearly through field-glasses at 5.30 a.m. on 17th.

ANENOUS.—Halley's comet seen here for first time at 5.45 a.m. on 19th; then very faint, became much brighter towards the end of month.

KRUIS RIVER (Uitenhage).—Being a very dry month, crops of barley and oats are beginning to feel the want of rain; veld getting very dry and parched looking. Cattle, so far, in good condition.

UITENHAGE PARK.—A very dry month, but, on the whole, a seasonable one. Rainfall below the average of eight years (1902-9). Five hot winds. Short but severe thunderstorm on 16th. One lightning fatality in district.

NEW BETHESDA (Graaff-Reinet).—Matters becoming serious through want of rain. ● Water scarce and weak. Veld dry; prospects for winter not at all bright.

RYEDALE (Aberdeen).—Drought; serious outlook for the winter.

SCHUILHOEK (Hanover).—Caterpillars have done an enormous amount of damage in the district.

WAVERLEY (Queenstown).—Perfect weather and very little wind this month.

HERSCHEL.—Mealie crops (the only) killed by early frost. No prevalent disease.

SUNNYMEADE (Albert).—A very dry month. Slight frost from 1st. Stock and crops doing well.

THIBET PARK (Queenstown).—Very dry during month.

KOKSTAD.—Halley's comet seen with naked eye on morning of 20th, near Venus, at 5.30 a.m., in a North-easterly direction. Severe frost from 26th inst.; some of the late mealies have been killed.

TENT KOP (Maclear).—Frost every night after the 19th. Ground very dry for the time of the year. Much wind towards end of month.

ARMADILLO CREEK (Vryburg).—No rain to be of service has fallen for past two months, and mealie fields all over this zone have succumbed to drought. No frost yet.

GROOT DRAKENSTEIN.—Mean temperature of month 1.7° above the average; mean maximum 5.2° above average. Rainfall of month 0.35 in. below the average. The extreme maximum (101.2°) is the highest ever registered in April, and this is the first time that 100° has been reached in that month.

KOKSTAD (Coyle).—Very little rain fell this month. A severe frost occurred on 28th. One of equal severity did not occur last year until June. There are many cases of enteric in country and town.

MOUNT AYLIFE.—The long continued postponement of frost of any severity has added considerably to the amount of grain that can be reaped. For years I have been trying to bring to the notice of Government the damage done to the country by the wholesale, uncontrolled, and indiscriminate destruction of the veld by grass fires. No attempt has ever been made to regulate what may be a necessary evil.

CARNARVON FARM.—There are no special features to record this month. As will be seen from subjoined table, the rainfall for this month is over 50 per cent. below the last 10 years' average. Six cloudless days is a record, the nearest approach being five in 1908. Rainy days are less than half the average. Windy days are also considerably below the average. What is badly wanted is a good rain. Ploughing at a standstill, ground too hard except where irrigated. All stock fat, and as grass is still green and plentiful, a good winter season is anticipated.

Year.	Rainfall.	Windy days.	Frost.	Cloudless days.	Rainy days.
1901	2.93	4	2	0	9
1902	0.65	7	11	1	3
1903	2.33	11	1	1	8
1904	0.16	12	5	3	2
1905	1.93	1	0	0	8
1906	0.54	5	8	2	4
1907	2.15	2	0	1	14
1908	1.21	13	6	5	5
1909	1.54	7	3	1	10
1910	1.02	4	5	6	3
Means	1.45	7	4	2	7

STATIONS.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ...	74.9	54.2	64.5	98.6	12	42.8	23
Wynberg ...	74.3	53.2	63.8	87.8	12	45.3	23
Cape Town (S.A.C.) ...	77.1	55.5	66.3	100.0	12	50.0	20 & 27
Do. City Hospital ...	74.1	53.5	63.8	97.9	12	48.2	23
Blaauwberg ...	68.7	54.0	61.4	84.0	11	47.9	20
Groot Constantia ...	72.7	51.9	63.8	93.0	12	47.0	25
Table Mountain (Disa Head) ...	67.2	53.9	60.6	88.7	12	42.0	25
Do. (Devil's Peak) ...	71.7	54.1	62.9	98.0	12	43.0	25
Bishopscourt ...	73.2	50.1	61.6	92.0	12	44.0	22, 23 & 26
Retreat ...	71.7	51.1	62.9	93.4	12	39.5	28
Robertson (Plantation) ...	78.0	51.7	64.8	95.0	12	37.0	25
Elsenberg (Agri. College) ...	76.7	53.5	65.1	100.7	12	45.5	22
Groot Drakenstein ...	80.0	51.3	65.6	101.2	12	41.3	19
Danger Point ...	64.6	53.9	59.2	70.0	12	48.0	26
Port Nolloth ...	71.6	51.0	62.8	99.0	13	40.5	19
Port Elizabeth ...	70.5	55.6	63.0	82.0	29	49.0	23 & 28
Cape Agulhas ...	66.2	56.5	61.4	73.0	30	50.0	23
Van Staaden's ...	71.0	52.8	63.4	86.0	30	46.0	18 & 23
Concordia (Plantation) ...	74.7	54.9	64.8	91.5	13	46.6	18
Storms River ...	74.5	52.0	63.2	91.2	13	41.5	18
Heidelberg ...	77.5	50.1	63.8	92.0	12	40.0	26, 27 & 28
Cape St. Francis ...	66.1	55.3	60.7	76.0	30	48.0	27
Dunbrody ...	82.4	50.1	66.2	95.2	2	34.8	27
Amalienstein ...	78.2	48.2	63.2	91.0	3	39.0	28
Hanover ...	75.9	40.3	58.1	86.0	11	29.0	28
Murraysburg ...	78.9	43.3	61.1	90.5	10	32.0	26
Kimberley ...	82.8	50.9	66.8	92.0	8	41.0	30
East London ...	73.3	57.5	65.4	85.0	21 & 30	47.0	28
Lovedale ...	78.3	50.1	64.2	90.0	14	38.0	27 & 28
Bedford ...	75.9	48.8	62.1	92.0	15	34.0	27
Cuthcart ...	73.5	45.3	59.4	84.2	11	30.0	27
Sydney's Hope ...	74.8	53.6	64.2	87.0	2	41.0	24 & 27
Stutterheim ...	75.5	50.9	63.2	88.0	14	37.2	27
Chiselhurst ...	79.0	55.6	67.3	89.0	3	45.0	27
Evelyn Valley ...	70.9	49.4	60.2	82.0	14	38.0	23 & 27
Aliwal North ...	79.2	41.9	60.6	89.5	8	31.0	28
Rietfontein (Aliwal N.) ...	73.5	44.3	58.9	82.2	8	32.0	27
Port St. John's ...	76.3	61.2	68.8	84.0	21	51.0	25
Tabankulu ...	73.2	49.7	61.4	86.0	7	35.0	27
Kokstad ...	72.3	45.0	58.6	83.9	7	29.5	27
Umtata ...	76.7	53.0	64.8	90.0	5	36.0	28
Mount Ayliff ...	78.5	51.5	65.0	93.0	7	36.0	27
Teyateyaneng ...	73.1	43.6	58.3	82.0	8	29.0	27
Mochudi (Bechuanaland) ...	83.4	49.0	66.2	90.0	5	33.0	30
Hope Fountain ...	75.2	51.8	63.5	83.4	3	41.2	29
Means ...	74.8	51.3	63.0	88.9	...	40.6	...
Extremes ...	...	...	...	101.2	12	29.0	27 & 28

RAINFALL, APRIL, 1910.

I. CAPE PENINSULA :

	INS.
Royal Observatory (a) 12in. gauge	1.15
Cape Town South African College	1.62
Do. Molteno Reservoir	1.88
Do. Platteklip	2.72
Do. Signal Hill	0.86
Do. Hospital	1.18
Sea Point, The Hall	1.04
Camp's Bay	1.27
Table Mountain, Disa Head	1.47
Do. Kasteel Poort	3.63
Do. Waai Kopje	4.32
Do. St. Michael's	5.20
Devil's Peak, Blockhouse	3.44
Do. Nursery	3.33
Newlands, Montebello	4.77
Bishopscourt	3.21
Kenilworth	2.49
Wynberg, St. Mary's	2.36
Groot Constantia	2.66
Tokai Plantation	2.94
Muizenberg (St. Res.)	3.31
Cape Point	0.74
Blaauwberg Strand	1.00
Robben Island	1.00
Durbanville	1.71
Maitland Cemetery	1.30
Tamboers Kloof	1.44
Woodhead Tunnel	3.40
Lower Reservoir	1.96
Maclars Beacon	5.45
Waai Vlei	4.98
Woodhead Dam	3.94
Retreat	1.39

II. SOUTH-WEST :

Eerste River	1.26
Klapmuts	1.89
Stellenbosch, Gaol	2.40
Somerset West	1.67
Paarl	2.54
Wellington, Gaol	1.85
Groot Drakenstein, Weltevreden	2.88
Porterville Road	1.57
Tulbagh	0.74
Kluitjes Kraal	1.78
Ceres	3.22
The Oaks	0.98
Rawsonville	0.90
Caledon	1.32
Worcester, Gaol	0.25
Karnmelks River	1.15
Lady Grey, Div. Robertson	0.28
Robertson, Gaol	0.58
Do. Govt. Plantation	0.79
Montagu	0.71
Danger Point	1.00
Elgin Plantation	2.58
Elsenberg Agricultural College	1.74
Rooskeen	1.00

III. WEST COAST :

Port Nolloth (Lieut. Barber)	0.00
Anenous	0.09
Klipfontein	0.11
Kraaifontein	0.05

III. WEST-COAST (continued) :

	INS.
Springbokfontein	0.23
Concordia	0.10
Garies	0.03
Lilyfontein	0.22
Van Rhyn's Dorp	0.24
Clanwilliam, Gaol	0.52
Dassen Island	0.79
Kersefontein	0.77
The Towers	1.13
Malmesbury	0.97
Piquetberg	2.13
Hopefield	0.65
Algeria (Clanwilliam)	1.72
Cedarberg (do.)	1.78
Welbedacht	0.43

IV. SOUTH COAST :

Cape Agulhas	0.77
Swellendam	1.33
Heidelberg	0.75
Riversdale	0.90
Mossel Bay	0.17
Great Brak River	0.56
Woodfield (George)	1.06
Sour Flats	0.78
Concordia	0.26
Plettenberg Bay	0.27
Harkerville	0.84
Blaauwkrantz	0.96
Lottering	0.67
Storm's River	0.57
Witte Els Bosch	0.37
Cape St. Francis	0.99
Witteklip (Sunnyside)	0.53
Van Staden's (Intake)	0.60
Do. (On Hill)	0.63
Kruis River	0.28
Uitenhage (Gaol)	0.48
Do. (Park)	0.31
Dunbrody	0.25
Port Elizabeth (Harbour)	2.13
Do. (Walmr Heights)	1.87
Shark's River (Nursery)	1.92
Centlivres	0.25
Edinburgh (Knysna)	0.46

V. SOUTHERN KAROO :

Ladismith	0.44
Amalienstein	0.45
Calitzdorp	0.24
Oudtshoorn	0.34
Vlaakte Plaats	0.63

VI. WEST-CENTRAL KAROO :

Beaufort West, Gaol	0.28
Dunedin	0.00
Nel's Poort	0.50
Camfers Kraal	0.26
Krom River	0.16
Beaken's Rug	0.27
Rietfontein	0.00
Steytlerville	0.00

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VII. EAST-CENTRAL KAROO.

Klipplaat	0·12
Graaff-Reinet (Eng. Yard) ...	0·33
New Bethesda	0·38
Roodbloem	0·42
Glen Harry	0·62
Rode Hoogte	0·62
Middlewater	0·21
Spitzkop (Graaff-Reinet) ...	0·15
Grobbelaar's Kraal	0·32
Gordonsville (Graaff-Reinet) ...	0·90
Muchputfontein	0·07
Zeekoe River	0·27

VIII. NORTHERN KAROO :

Calvinia	0·15
Sutherland	0·28
Brakfontein	0·11
Victoria West	0·36
Wilbebeestkooij	0·12
Murraysburg	0·33
Varkens Kop	0·66
Craddock (Gaal)	0·45
Maraisburg	0·30
Tarkastad	0·38
Drummond Park	0·36
Waverley	0·29
Schuilhoek	0·48
Hartebeestfontein	0·54
Willow Walk (Tarka)	0·61
Hotweg Kloof (Craddock) ...	0·50
Rieghtersfontein	0·70

IX. NORTHERN BORDER

Kenhardt	0·03
Upton	0·00
Trooilapspan	0·00
Dunmurry	0·00
Newlands, Barkly West	0·04
Barkly West	0·11
Kimberley (Gaal)	0·32
Strydenburg	0·00
Rietfontein (Gordon)	0·00
Stoffkraal (Prieska)	0·00
Rocklands	0·20

X. SOUTH EAST :

Bedford (Hall)	0·63
Sydney's Hope	0·82
Atherstone	0·45
Alexandria	1·47
Fort Fordyce	0·45
Katberg	0·60
Seymour	0·22
Glencairn	0·15
Lovedale	0·45
Port Alfred	1·14
Hogsback	0·95
Keiskamma Hoek	0·47
Cathcart (Gaal)	0·22
Cathcart	0·17
Thaba N'doda	0·90
Evelyn Valley	1·87
Crawley	0·00
Thomas River	0·20
Perie Forest	0·65
Forestbourne	0·75
Isidenge	0·77
Kellogha	0·44
King William's Town (Gaal) ...	0·08
Statterheim	0·45
Fort Cunyngame	0·17

X. SOUTH EAST (continued) : INS.

Kubusie	0·96
Quacu	0·33
Chiselhurst	0·68
East London West	0·47
Cata	0·58
Wolf Ridge	0·62
Dontsah	0·37
Mount Coke	0·10
Albert Vale (near Bedford) ...	0·42
Kubusie (Dist. Engr.)	0·40
Inzileni (K.W.T.)	0·36

XI. NORTH-EAST :

Venterstad	0·76
Mooifontein	1·35
Lyndene	0·80
Thibet Park	0·50
Jamestown	0·90
Queenstown (Gaal)	0·00
Rietfontein (Aliwal North) ...	1·34
Herschel	0·91
Lady Grey	2·34
Contest (Near Bolotwa)	0·48
Keilands	0·26
Cliftonvale	0·42
Sunnymede (Div. Albert)	0·57

XII. KAFFRARIA.

Ida (Xalanga)	0·89
Cofimvaba	0·30
N'qamakwe	0·28
Engcobo	0·30
Butterworth	0·28
Woodcliff	0·62
Kentani	0·60
Maclear (Station)	0·57
Idutywa	0·00
Bazeya	0·84
Willowvale	0·31
Mount Fletcher	0·75
Somerville (Tsolo)	0·28
Umtata	0·17
Cwebe	1·46
Tabankulu	1·12
Kokstad	0·68
Do., The Willows	0·76
Seteba	0·95
Flagstaff	0·87
Port St. John's	1·01
Umzimkulu	0·68
Umzimkulu (Strachan)	0·61
Tent Kop (Elands Height)	0·51

XIII. BASUTOLAND :

Maseru	0·88
Teyateyaneng, Beca	0·83
Qacha's Nek	0·80

XIV. BECHUANALAND :

Zwartlaagte	0·00
Nottingham	0·22
Masilibitani	0·06
Armadillo Creek	0·00
Mochudi	0·00
Chawbe (Vryburg)	0·00

XV. RHODESIA :

Hopefontein	0·04
Rhodes Matoppo Park	0·00

DEPARTMENTAL NOTICES.

EAST COAST FEVER.

The following Proclamations are *Gazetted* :

No. 198, of 1910, sets forth that, whereas the disease known as East Coast Fever has made its appearance among cattle in the District of Elliotdale, the Districts of Elliotdale, Mqanduli, and Willowvale shall be taken and deemed to be a suspected area.

And, further, it shall not be lawful to remove or cause or allow to be removed or permit to stray any horned cattle from or into the said Districts, or from any one farm, Native Location, Forest Reserve, Outspan, or Commonage, to any other such place as aforesaid within the said Districts.

Any person contravening this Proclamation shall be liable, on conviction, to a fine not exceeding fifty pounds sterling (£50), or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months, unless such fine be sooner paid, and that any horned cattle removed or permitted to stray in contravention of this Proclamation may be forthwith destroyed, or otherwise disposed of, at the discretion of the Secretary for Agriculture, or any Officer thereto duly authorised by him, without payment of compensation.

Proclamation No. 226 sets forth that, whereas the disease known as East Coast Fever has made its appearance among cattle in East Griqualand and Tembuland, and whereas it is desirable that every possible measure should be taken to prevent the spread of the said disease into the Colony proper, the main road to and from the Transkeian Territories, where it crosses the Kei Bridge and all roads or drifts crossing the Great Kei River, south of the said Bridge to the mouth of the Great Kei River, shall be closed to all horned cattle, whether proceeding from the Transkeian Territories or the Colony proper.

Any person contravening the provisions of this Proclamation shall be liable, upon conviction, to a penalty not exceeding fifty pounds sterling (£50), or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months, unless such fine be sooner paid, and any horned cattle removed or permitted to stray across the Kei Bridge or other such roads or drifts as aforesaid in contravention of this Proclamation, shall be liable to be summarily destroyed or otherwise disposed of at the discretion of the Secretary for Agriculture or any officer thereto duly authorised by him, without payment of compensation.

T

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CURRENT MARKET RATES (WHOLESALE) OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 28th May, 1910, ruling at the several centres named, is published for general information.

CENTRE.	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.	P.	Q.	R.
	Wheat per 100 lbs.	Wheat Flour per 100 lbs.	Boer Meal per 100 lbs.	Mealies per 100 lbs.	Mealie Meal per 100 lbs.	Barley per 100 lbs.	Oats per 100 lbs.	Oat-hay per 100 lbs.	Lucerne Hay per 100 lbs.	Potatoes per 100 lbs.	Tobacco (Boer Roll) per lb.		Beef per lb.	Mutton per lb.	Fresh Butter per lb.	Eggs per doz.	Cattle (Slaughter) per lb.	Sheep (Slaughter)
Aliwal North..	0 9 6	1 1 6	0 12 6	0 5 0	0 7 6	0 8 0	0 9 0	0 7 6	0 4 0	0 5 0	0 1 0	0 0 6	0 0 6	0 0 6	0 1 3	0 1 6	£10 10s.	15/-
Beaufort West	0 10 0	0 17 0	0 13 0	0 6 3	0 8 0	0 11 0	0 8 0	0 4 0	0 4 0	0 7 0	0 1 0	0 1 0	0 0 6	0 0 3	0 1 3	0 2 0	£9	11/-
Burgersdorp	0 8 0	0 17 0	0 12 9	0 5 3	0 7 6	0 6 6	0 6 6	0 4 0	0 4 0	0 7 0	0 0 10	0 0 7	0 0 6	0 0 4	0 1 3	0 1 6	£10	14/-
Cape Town	11 8 0	12 6	11 8 0	0 6 0	0 7 0	0 5 0	0 5 0	0 3 0	0 5 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 6	0 1 3	0 1 6	£7 10s. to £9	10/- to 20/-
Clan William	0 10 6	0 11 6	0 13 0	0 5 0	0 7 6	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£9 10s.	13 6
Collegberg	0 8 0	1 1 0	0 14 0	0 5 0	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£10	19
Dordrecht	0 9 0	0 18 0	0 13 6	0 5 0	0 8 0	0 5 0	0 5 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£7 5s.	9 6
East London	0 10 6	0 19 0	0 14 0	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£7 5s.	9 6
Grass-Reinet	0 9 9	0 18 0	0 13 6	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£7 5s.	9 6
Grahamstown	0 9 9	0 18 0	0 13 6	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£7 5s.	9 6
Kimberley	0 9 9	0 18 0	0 13 6	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£7 5s.	9 6
King William's Town	0 9 0	0 18 0	0 13 0	0 4 6	0 5 6	0 5 6	0 5 0	0 3 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£11	13 6
Matroosburg	0 10 0	0 18 0	0 13 0	0 5 3	0 7 6	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£12	20/-
Mossel Bay	0 12 0	0 18 0	0 13 0	0 6 0	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£10	12 6
Port Alfred	0 13 0	0 19 0	0 14 0	0 6 0	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£10	12 6
Port Elizabeth	0 10 0	0 18 0	0 13 0	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£7	15/-
Takpana	0 10 0	0 18 0	0 13 0	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£8 to £10	9/- to 12/-
Tarkenton	0 10 0	0 18 0	0 13 0	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£8 to £10	9/- to 12/-
Verburg	0 10 0	0 18 0	0 13 0	0 5 9	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£8 to £10	9/- to 12/-
Worcester	0 10 6	0 14 6	0 12 6	0 6 0	0 8 0	0 6 0	0 6 0	0 4 0	0 4 0	0 6 0	0 1 0	0 0 6	0 0 6	0 0 3	0 1 3	0 1 6	£8 to £10	14/- to 18/-

NOTE.—A blank space denotes "no transactions."

PRODUCE MARKETS.

CAPE TOWN.

The Produce Department of R. Müller, Cape Town, reports for the month ending May 31:—

Ostrich Feathers.—Prices have somewhat receded. Buyers are not anxious to operate, because shipments will only arrive in London just in time for the July Auctions. There is a fair demand for good qualities required for the local trade.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes ...	17	10	0	22	10	0	Floss ...	0	7	6	1	10	0
First, ordinary to							Long Drabs ...	2	0	0	4	0	0
Seconds ...	11	0	0	15	0	0	Medium Drabs ...	0	15	0	1	5	0
Thirds ...	7	0	0	8	10	0	Short to Medium ...	0	2	6	0	15	0
Femina Super ...	2	10	0	4	10	0	Floss ...	0	5	0	1	5	0
Do., Seconds to	12	10	0	17	10	0	White Tails ...	1	2	6	2	5	0
Firsts ...	4	10	0	10	10	0	Coloured Tails ...	0	12	6	1	5	0
Byocks (Fancy) ...	4	10	0	8	10	0	Chicks ...	0	1	0	0	2	6
Long Blacks ...	4	0	0	7	0	0	Spadonas ...	0	10	0	2	10	0
Medium Blacks ...	1	10	0	2	10	0	Inferior Black and						
Short to Medium ...	0	10	0	2	10	0	Drabs, short to						
							long ...	0	0	6	1	7	6

Wool.—Quantities, which have arrived here for sale or for shipment, are but small. Prices obtained are very satisfactory. This is proved by the following prices which are being obtained in Cape Town at present, viz.: Malmesbury, 6½d.; Calvinias, 6¾d.; Roggeveld, 9½d.; Piquetberg, 6½d.; Coarse and Coloured, 3¾d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld ...	0	5½	0	6½	Wool for Washing ...	0	4½	0	7½
Do. Karoo ...	0	6	0	7½	Snow-white Super to Extra	1	4	1	9
Medium ...	0	5	0	6½	Do. Ordinary ...	1	2	1	5
Short and inferior ...	0	3	0	4½	Fleece Washed ...	0	0	0	10

Mohair.—No change is to be reported, and the turnover in this article is moderate.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer ...	0	6	1	1	Winter ...	0	9	0	9½
Kids ...	1	3	1	8	Do. Kids ...	0	11	1	2
Seconds ...	0	5	0	9					

Hides and Skins.—Although the London market is not so good for goat skins, the Cape Town market remains unchanged: Light goat skins fetch 14½ per lb.; Heavy goat skins, 12½ per lb.; Sundried, 6d. per lb.; Scurvy, 6d. per piece; Karoos, 5½d. per lb.; Caledons, 6½d. per lb.; Grassvelds, 6d. per lb.; Short Wools, 4½d. per lb.; Pelts, 3½d. per lb.; Bastards, 4½d. per lb.; Large Capes, 2s. 6d. per piece; Medium Capes, 2s. per piece; Cut Capes, 1s. per piece; Damaged and Lambs, 6d. per piece; Angoras, 6½d. per lb.

	s.	d.	s.	d.		s.	d.	s.	d.
Long woolled Skins ...	0	5½	0	6½	Goat, heavy to light ...	1	0½	1	2½
Short ...	0	4	0	4½	Sundried ...	0	0	0	6
Shorn ...	0	0	0	4	Angoras ...	0	4	0	6½
Bastards ...	0	3½	0	4½	Salted Whites ...	0	5½	0	7
Cape Skins, each ...	2	0	2	6	Sundried Hides ...	0	6½	0	7½
Do., out, each ...	0	0	1	0	Wet ...	0	3½	0	4½

PORT ELIZABETH.

Messrs. John Daverin and Co. report under date May 27:—

Ostrich Feathers.—Owing to Tuesday being a holiday, only two and a half days' Sale was held this week, when an assortment of the usual average was offered. Competition was fairly active, and prices generally showed no change from last week. Stocks continue heavy, but new arrivals are falling off. The next London Sales open on the 6th proximo, and our cable received this morning from our London Correspondent says that somewhat lower prices are expected for good qualities, owing to large supplies. The total quantity sold on our Public Market this week amounted to £14,386 1s. 3d., and weighed 4,825 lbs. 4¾ ozs.

PRIMES :	£	s.	d.	£	s.	d.	TAILS (continued) :	£	s.	d.	£	s.	d.	
Extra Super ...	30	0	0	45	0	0	Female, dark, good							
WHITES :							average ...	0	6	6	to	0	12	6
Good to Super ...	12	10	0	25	0	0	„ dark, short							
Good Broken ...	9	0	0	15	0	0	and narrow...	0	0	6	„	0	2	6
Fair Average ...	8	0	0	10	0	0	BLACKS :							
Narrow ...	5	10	0	7	10	0	Long (special) ...	7	0	0	„	12	10	0
Thirds ...	2	0	0	5	0	0	„ good ...	5	5	0	„	7	0	0
FEMINAS :							„ fair ...	3	15	0	„	5	0	0
Super ...	13	0	0	22	10	0	„ drabby ...	2	0	0	„	3	10	0
Good to Super ...	8	0	0	12	10	0	Medium ...	1	10	0	„	3	15	0
Good Broken ...	6	0	0	12	0	0	Short ...	0	12	6	„	1	5	0
Fair Average ...	5	0	0	7	0	0	Wiry ...	0	0	6	„	0	2	6
Narrow ...	1	15	0	4	0	0	Floss, long ...	0	12	6	„	1	2	6
Thirds ...	0	15	0	2	0	0	„ short ...	0	5	0	„	0	9	0
Greys ...	3	0	0	10	0	0	DRABS :							
FANCIES :							Long (special) ...	4	10	0	„	7	0	0
Super ...	8	10	0	11	10	0	„ good ...	2	15	0	„	3	15	0
Good ...	6	10	0	8	0	0	„ fair ...	1	5	0	„	1	15	0
Poor and Narrow ...	3	0	0	5	0	0	Medium ...	0	12	6	„	1	10	0
TAILS :							Short ...	0	2	6	„	0	9	0
Male, good big bold	2	5	0	3	10	0	Wiry ...	0	0	3	„	0	1	0
„ good average	1	0	0	1	15	0	Floss, long ...	0	12	6	„	1	2	6
„ Short & Narrow	0	7	6	0	15	0	„ short ...	0	5	0	„	0	7	6
Female, light, good,							SPADONAS :							
big, bold ...	2	0	0	3	10	0	Light (special) ...	5	0	0	„	7	0	0
„ light, good							„ fair to good...	1	0	0	„	3	10	0
average ...	1	0	0	1	15	0	„ narrow ...	0	5	0	„	0	15	0
„ light, short							Dark ...	0	10	0	„	3	0	0
and narrow...	0	3	6	0	10	0	CHICKS ...	0	0	3	„	0	7	6
„ dark, good,														
big, bold ...	0	15	0	1	10	0								

The following may be quoted as the approximate current values of unsorted parcels per line:—

				Whites.				Feminas.												
Superior pluckings ...	...	...	...	£9	0	0	to	£13	0	0	£6	10	0	to	£9	0	0			
Good Average lots ...	...	...	...	7	0	0	to	8	10	0	5	0	0	to	6	0	0			
Poor Average lots ...	...	...	...	4	10	0	to	6	10	0	2	0	0	to	3	15	0			
Common lots, stalky, narrow and discoloured ...	...	...	...	2	0	0	to	4	0	0	1	0	0	to	1	15	0			
Tails.				Blacks.				Drabs.				Spadonas.								
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.		
Good ...	11	0	to	16	0	25	0	to	60	0	12	6	to	17	6	30	0	to	40	0
Average ...	7	6	to	10	0	17	6	to	20	0	10	0	to	12	6	12	6	to	20	0
Poor ...	3	6	to	6	6	10	0	to	12	6	5	0	to	7	6	2	6	to	10	0

It will be understood that for Special Lots these quotations may be exceeded.

Wool.—This Market continues steady, but the amount of business done in the open market during the week has been limited, chiefly owing to small supplies, the season now being over. At the Catalogue Sale, on Thursday, 1,167 bales were offered, about half being sold, at unchanged prices.

Snowwhite, Extra Superior ... 20½d to 21½d	Grease, Coarse and Coloured ... 1d to 4d
Do. Superior ... 18½d „ 19½d	Scoured do. do. ... 1½d „ 8½d
Do. Good to Superior... 17d „ 17½d	Basuto Grease, short ... 6½d „ 6½d
Do. Inferior Faulty ... 14d „ 15d	O.R.C. Grassveldt Grease, long
Grease, Super Long, well-con-	& well-conditioned
ditioned, Grassveldt	(special clips) 7½d „ 8d
grown (special clips) ... 8½d „ 10d	Do. do. do. ... 6½d „ 7d
Do. do. do. ... 7½d „ 8½d	Do. do. medium grown,
Do. do. Karoo grown	light, with little
(special clips) 7½d „ 8½d	fault... ... 6d „ 6½d
Do. do. do. ... 6½d 7½d	Do. do. short, faulty & wasty 4½d „ 5½d
Do. do. Mixed Veldt... 7d „ 7½d	Do. do. Karoo grown, long &
Do. Light, faultless, medium	well-conditioned ... 6½d „ 7½d
Grassveldt grown ... 6½d „ 7½d	Do. do. medium grown, light
Do. do. Karoo grown 6½d „ 7½d	with little fault ... 6d „ 6½d
Do. do. short, do. 6d „ 6½d	Do. do. short, faulty and
	wasty... ... 4½d „ 5½d

Mohair.—This Market continues very firm, and about 500 bales, Summer Firsts, have been sold in the open market (of which 220 bales were sold by ourselves). The demand is running chiefly on fine quality, strong-grown clips being neglected. On the Public Market on Wednesday a large quantity was offered, chiefly consisting of mixed parcels, and prices ruled firm.

Super Kids ... 23d to 24d	Mixed O.R.C. very mixed ... 7d to 8d
Ordinary Kids and Stained ... 15d „ 18d	Seconds and Grey ... 5d „ 7½d
Superior Firsts, special clips ... 13d „ 13½d	Thirds ... 4½d „ 4½d
Ordinary Firsts... ... 11½d „ 12d	Winter Kids, special clips,
Short Firsts and Stained ... 10d „ 10½d	nominal ... 16d „ 16½d
Superfine Long Blue O.R.C.	Do. good ordinary ... 14d „ 15d
Hair ... 12½d „ 13½d	Winter Hair ... 9½d „ 10d
Mixed O.R.C. Hair (average) 8½d to 10½d	Basuto Hair ... 8½d „ 10d

Skins.—Sheepskins sold this week in bundles at 5½d., and Pelts at 4½d. per lb.; Capes, 2s. 1d.; damaged, 6d. each; Goatskins, 13½d.; damaged, 7d. per lb.; and Heavy Goatskins, 8½d.; Angoras, 7½d.; Shorn, 5½d.; damaged, 3½d. per lb.; Johannesburg Sheep, 5½d.; Goat, 9d.; Angoras, 6½d.; Springbok, 8½d. each.

Hides.—Sundried 9½d., damaged 8½d.; Salted 8½d., damaged 7½d., Thirds 3½d.

Horns.—3½d. each all round.

EAST LONDON.

Messrs. Malcomess and Co., Ltd., report for the month ending May 31:—

Wool.—The London Sales opened on the 26th of April, and closed on the 12th of May, without any change in prices, except that heavy long Capes were weaker, owing to wasty condition. 24,000 bales Australasians and 1,000 bales Capes were held over for next series, which is not a good sign for the future. Reports from manufacturing centres are unchanged, but users are adopting a hand to mouth policy, fully realising that to-day's level is above the average, and are only buying what is absolutely necessary for their requirements.

The local Sales have been held during the month, with the following results: 30th April, 3,800 bales offered, 1,300 sold; 7th May, 3,800 bales offered, 1,400 sold; 14th May, 2,500 bales offered, 900 sold; 21st May, 2,500 bales offered, 400 sold; 25th May, 1,000 bales offered, 500 sold.

Prices have ruled without change throughout the month for all light, well-conditioned wools, whilst damp, heavy, wasty wools were neglected.

In addition some private sales have been put through, and the total for the month is about 8,000 bales, leaving stocks on hand about 12,000 bales, with very little to arrive. We quote:—

Transkei Natives Grease ...	7½d to 8½d	Short ditto well-conditioned	7½d to 8½d
Basuto ditto ...	6½d „ 7d	Good Long well-conditioned	
Ordinary Native Grease ...	6½d „ 7d	Grassveldt ...	6½d „ 8d
Super Light Long Kaffrians, well-conditioned...	10d „ 11d	Good Short ditto ...	5½d „ 6½d
Super Light Short ditto ...	9d „ 10d	Short faulty Grease ...	4½d „ 5½d
Long well Skirted Farmers ...	No stocks	Coarse and Coloured Grease	3½d „ 4½d

Mohair.—We have had a strong market, and offerings have been on a larger scale. Owing to the strong tone, there has been a good demand, which sellers have been meeting. The result is there has been no accumulation of stock. This season's clip leaves a good deal to be desired, as far as length and quality are concerned, and a large percentage of the kids is seedy. We quote:—

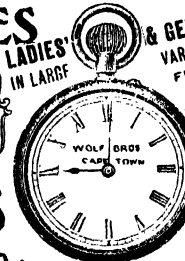
Superior Kids ...	22½d to 23d	Mixed O.R.C. ...	9½d to 11d
Average Kids (seedy)...	16d „ 18d	Seconds and Greases ...	5d „ 7½d
Superior Firsts, Special Clips	13d „ 13½d	Thirds ...	4½d „ 5½d
Ordinary Firsts ...	12d „ 12½d	Basuto Mohair...	9d „ 11d
Short Firsts ...	11d „ 12d		

Sundry Produce.—We quote: Sheepskins, 5½d. for First quality, 4½d. for Second; Goatskins, 12½d.; Angora skins, 8½d.; damaged, 6d. each. Dry-salted Hides, 8½d.; Sundried Hides, 9½d. Horns, 2d. to 4d. each, according to size and quality.

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SPECIALS ONLY.—Choice pairs, £50 to £100 per pair.—F. W. BAKER, Laughing Waters, Willowmore.

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GENERAL.

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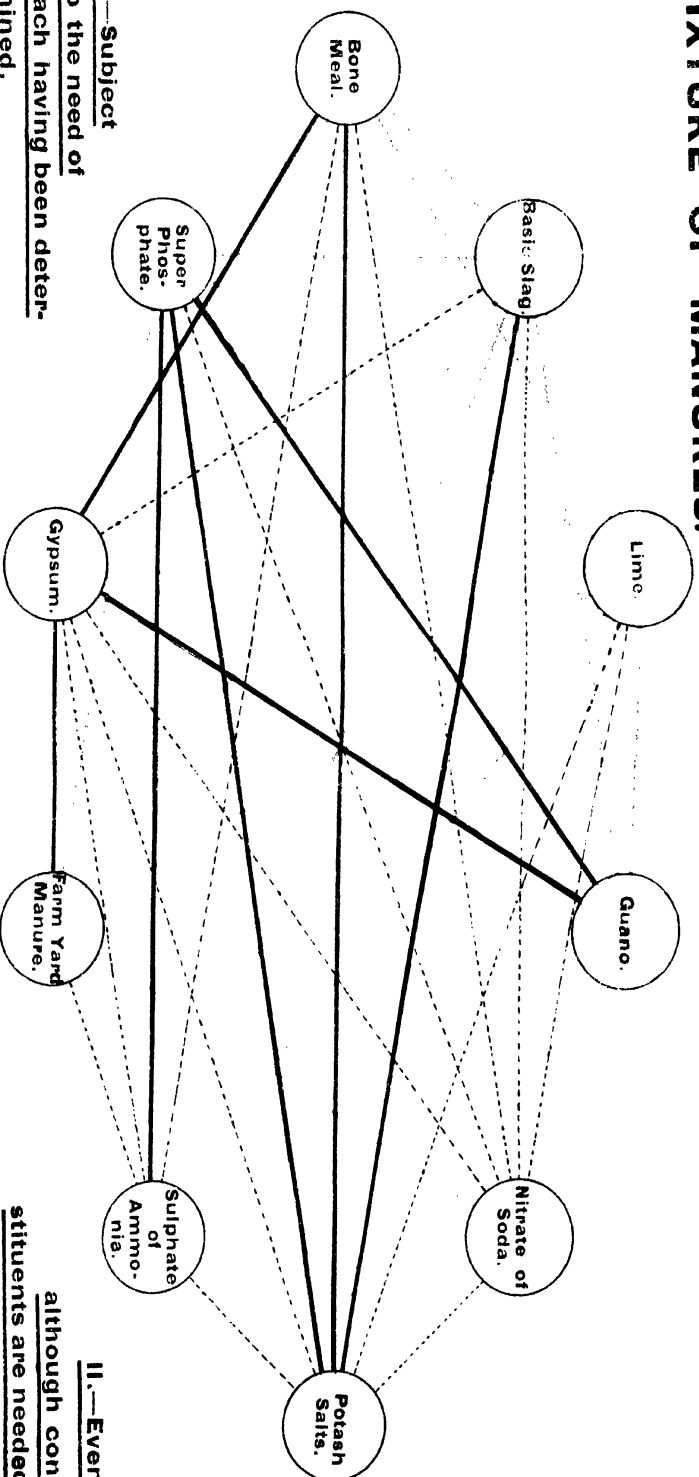
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CAPE TOWN

MIXTURE OF MANURES.



I.—Subject
to the need of
each having been deter-
mined.

A. Combinations recommended to
be mixed or simultaneously applied. _____

B. Combinations recommended to be
applied at different seasons to the same

II.—Even
although con-
stituents are needed
by the soil.

C. Combinations to be avoided
because of harmful reaction.

D. Combinations which are not necessary.

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